



CHEETAL

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The Wild Life Preservation Society of India

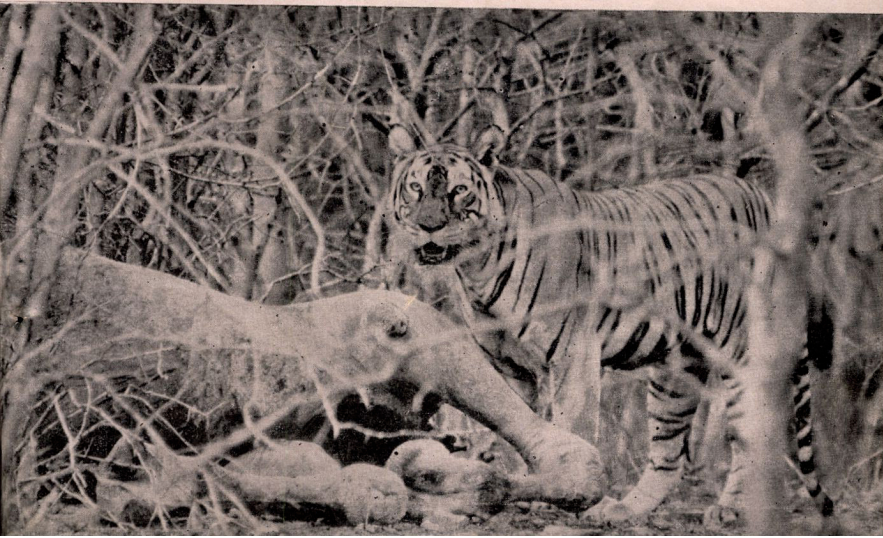
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TIGRESS FEEDING ON CAMEL KILL, RANTHAMBORE, 22nd MAY 1978.

—Photo by : K.S. Sankhala.



APPEAL

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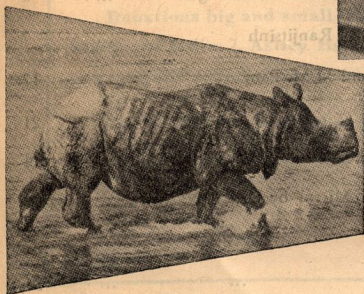
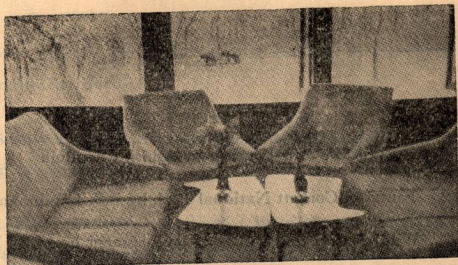
Honorary Secretary.

CONTENTS

	PAGES
1. On Wildlife and Tourism by Ashish Chandola	1
2. Fauna of Corbett National Park by B.S. Lamba and R.K. Bhatnagar	3
3. Wildlife Conservation and Development by M.K. Ranjitsinh	7
4. The Phantom Killer of Dogadda by S P. Sahi and M.M. Pant	17
5. Saving The Tiger by M. Krishnan	21
6. Irula Wildlife Co-operative by Romulus Whitaker	24
7. Project Tiger and Simon Winchester's Crooked Mirror by Dr. R.N. Misra	29
8. Rejoinders by :	
(i) M. Krishnan	31
(ii) Dr. Karan Singh	33
(iii) S.K. Seth	34
(iv) S.R. Chaudhury	37
(v) H.S. Panwar	42
(vi) K. Chakrabarti	45
(vii) Dilnavaz Variava	46
(viii) S.P. Sahi	48
(ix) Peter F.R. Jackson	53
9. Significance of the absence of optic nerves in a teratological specimen of <i>Gavialis gangeticus</i> (Reptilia : Crocodilia) by A.N. Singh and B.K. Tandon	55

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CHEETAL

Journal of the Wildlife Preservation Society of India

Vol. XIX

June, 1978

No. 4

On Wildlife and Tourism

ASHISH CHANDOLA

Excessive tourism, it is argued, is contrary to conservation and wildlife interests. I believe this to be very true. The uncontrolled movement of people, coupled with over elaborate tourist facilities, can be a source of intense harassment to wildlife. In the case of endangered species, where numbers are already very low, breeding may suffer or even cease due to such disturbance. This may well be one side of the picture, but there is just a little more to say about wildlife tourism.

Taking the case of East Africa for example, there, like in so many other parts of the world, the greatest numbers of animals exist only within National Parks. Wildlife tourism—following the big travel boom ushered in by the advent of the 'jet age'—came as manna from Heaven for the developing countries of that region, so much so that the economic benefits brought about by the influx of tourists brought hope for the future survival of wildlife.

However, I am not suggesting that we attempt to emulate the African modus operandi. We cannot. Our forests, wildlife and conditions here are very different, and hence the need for **limited tourism**.

Tourism must lead to excesses—this commonly repeated argument based on the assumption that a tourist operation would aim only at making money at the expense of wildlife, is strictly speaking not true. This argument would not hold water after limiting the tourist operation both in the number of tourist and scope of commercial operation. Since the tourist operation could only in fact exist on the continued health and wellbeing of wildlife and the environment, this would be a positive factor in the protection and consolidation of wildlife sanctuaries.

There is no reason for us to fight shy of wildlife tourism. Wildlife is a natural resource which constantly replenishes itself. In accepting tourism we are 'utilising' this natural resource. Tourists would be encouraged to 'see and enjoy' but not use wildlife. Tourism is an industry of vital importance, it brings money into the country with no strings attached, also nothing speaks so well of a country to the outside world than an efficient tourist operation. We cannot afford to ignore the economic benefits tourism can bring.

I am not suggesting that the economic benefits of wildlife tourism are sufficient for wildlife protection alone; on the contrary, wildlife protection should rest on firmer moral, aesthetic and scientific grounds, though economic benefits can be of help, and have been as in East Africa.

We have noticed that villagers living on the periphery, or within a sanctuary do not take very kindly to the establishment of a wildlife preserve for obvious reasons. This is a problem that has to be tackled by Government, and on a very different footing. Here a tourist operation can help to ease the pressure by providing employment and other opportunities to the local people; this creates a positive situation that can go a long way towards breaking down resistance to wildlife preserves.

Speaking of the average tourist, I agree that tourists may or may not have a positive interest in wildlife, but even those who are just along for the ride are being exposed to visual stimuli, and of the potential of increased awareness, which in the long run is going to be far more effective than a flood of propaganda urging them to help save some rare species. We should not forget that there are also the people who support international organisations like the WWF by contributing money and power resources for conservation measures throughout the world. All things being equal, conservation measures will not succeed without basic public support.

If so far wildlife enthusiasts have been guilty of disturbing wildlife, I believe that more than anyone else the conservationists are to blame, for not providing necessary facilities for people to view animals with maximum efficiency. Properly organised and well planned tourism does not disturb wildlife. The recreational and educational value of such tourism cannot be overstressed.

Henry David Thoreau had pointed out more than a hundred years ago, that the preservation of the wilderness rests upon the shoulders of us all. This brings us to the basic question of why preserve wildlife? For its own sake; for posterity, for humanity I presume. Man finds himself involved in a great cause, the earth and its creatures are his concern. His sentiments reach out for the endangered animals and threatened habitats that everyone should be allowed to see and enjoy this heritage in a manner most fitting, supports the whole idea of conservation.

What I am trying to say is quite simple. Wildlife tourism is here and it is here to stay. All indications are that it is going to increase in the years to come. There are considerable benefits directly and indirectly to the conservation cause. Rather than condemning, seeking to thwart its objectives and keeping wildlife tourism as a low priority, steps should be taken to organise well planned tourist operations for our sanctuaries and National Parks, failing which these areas would be subject to haphazard tourism growth, which would once again ruin some of our best Nature Preserves.

Fauna of Corbett National Park

(Continued from Cheetal, Vol. XIX, No. 1, Sept. 1977)

By B.S. LAMBA AND R.K. BHATNAGAR

119. *Grus antigone antigone* (Linnaeus) : Innian Sarus Crane.

120. *Anthropoides virgo* (Linnaeus) : Damoiselle Crane.

Family : Rallidae : Rails, Coots.

121. *Rallus striatus albiventer* Swainson : Indian Bluebreasted banded Rail.

122. *Rallina eurizonoides amauroptera* (Jerdon) : Indian or Slaty legged Banded Crane.

123. *Porzana pusilla pusilla* (Pallas) : Eastern Baillons Crane.

124. *Porzana porzana* (Linnaeus) : Spotted Crane.

125. *Amaurornis fuscus bakeri* (Hartert) : Northern Ruddy Crane.

126. *Amaurornis akool akool* (Sykes) : Brown Crane.

127. *Amaurornis phoenicurus chinensis* (Boddaert) : Chinese Whitebreasted Waterhen.

128. *Gallixrex cinerea cinerea* (Gmelin) : Kora or Watercock.

129. *Gallinula chloropus indica* Blyth : Indian Moorhen.

130. *Porphyrio porphyrio poliocephalus* (Latham) : Indian Purple Moorhen.

131. *Fulica atra atra* Linnaeus : Coot.

Family : Otididae Bustards.

132. *Eupodotis bengalensis bengalensis* (Gmelin) : Bengal Florican.

Order Chardriiformes

Family : Jacanidae : Jacanas.

133. *Hydrophasianus chirurgus* (Scopoli) : Pheasant-tailed Jacana.

134. *Metopidius indicus* (Latham) : Bronzewinged Jacana.

Family Charadriidae : Plovers, Sandpipers, Shipes.

135. *Vanellus gregarius* (Pallas) : Sociable Lapwing.

136. *Vanellus vanellus* (Linnaeus) : Peewit, Lapwing, or Green Plover.

137. *Vanellus indicus indicus* (Boddaert) : Redwattled Lapwing.

138. *Vanellus spinosus duvaucelli* (Lesson) : Spurwinged Lapwing.

139. *Vanellus malabaricus* (Boddaert) : Yellow-wattled Lapwing.

140. *Charadrius dubius* Scopoli : Little Ringed Plover.

141. *Charadrius alexandrinus alexandrinus* Linnaeus : Kentish Plover.

142. *Numenius arquata orientalis* C.L. Brehm : Eastern Curlew.

143. *Limosa limosa limosa* (Linnaeus) : Blacktailed Godwit.

144. *Tringa totanus eurhinus* (Oberholser) : Eastern Redshank.

145. *Tringa nebularia* (Gunnerus) Greenshank.
146. *Tringa ochropus* Linnaeus : Green Sandpiper.
147. *Tringa glareola* Linnaeus : Wood or Spotted Sandpiper.
148. *Tringa hypoleucos* Linnaeus : Common Sandpiper.
149. *Capella stenura* (Bonaparte) : Pintail Snipe.
150. *Capella gallinago gallinago* (Linnaeus) : Common or Fantail Snipe.
151. *Capella minima* (Brunnich) : Jack snipe.
152. *Scolopax rusticola rusticola* Linnaeus : Woodcock.
153. *Calidris minutus* (Leisler) : Little stint.
154. *Calidris temminckii* (Leisler) : Temminck's Stint.
155. *Calidris alpinus alpinus* (Linnaeus) : Dunlin.
156. *Calidris testaceus* (Pallas) : Curlew Sandpiper.

Family : Rostratulidae : Painted snipe.

157. *Rostratula benghalensis benghalensis* (Linnaeus) : Painted snipe.

Family : Recurvirostridae : Stilts, Avocets, Ibisbill.

158. *Himantopus himantopus himantopus* (Linnaeus) : Indian Blackwinged Stilt.
159. *Recurvirostra avaosetta* Linnaeus : Avocet.
160. *Ibidorhyncha struthersii* Vigors : Ibisbill.

Family : Burhinidae : Stone Curlews.

161. *Burhinus oedicephalus indicus* (Salvadori) : Indian Stone Curlew.
162. *Esacus magnirostris recurvirostris* (Cuvier) : Great Stone Plover.

Family : Glareolidae : Coursers, Pratincoles.

163. *Glareola lactea Temminck* : Small Indian Pratincole.

Family : Laridae : Gulls & Terns.

164. *Chlidonias hybrida indica* (Stephens) : Indian Whiskered Tern.
165. *Gelochelidon nilotica nilotica* (Gmelin) : Gullbilled Tern.
166. *Sterna aurantia* J.E. Gray : Indian River Tern.
167. *Sterna acuticauda* J.E. Gray : Blackbellied Tern.

Order : Columbiformes.

Family : Columbidae : Pigeons, Doves.

168. *Treron apicauda apicauda* Blyth : Pintailed Green Pigeon.
169. *Treron sphenura sphenura* (Vigors) : Kokla or Wedgetailed Pigeon.
170. *Treron bicincta bicincta* (Jerdon) : Indian Orange breasted Green Pigeon.
171. *Treron phoenicoptera phoenicoptera* (Latham) : Bengal Green Pigeon.

172. *Columba livia intermedia* Strickland : Indian Blue Rock Pigeon.
173. *Macropygia unchall tusalia* (Blyth) : Bartailed Cuckoo-Dove.
174. *Streptopelia orientalis meena* (Sykes) : Western Turtle-Dove.
175. *Streptopelia decaocto decaocto* (Frivaldszky) : Indian Ring Dove.
176. *Streptopelia tranquebarica tranquebarica* (Hermann) : Indian Red-Turtle Dove.
177. *Streptopelia chinensis suratensis* (Gmelin) : Indian Spotted Dove.
178. *Streptopelia senegalensis cambayensis* (Gmelin) : Indian Little Brown Dove.
179. *Chalcophaps indica indica* (Linnaeus) : Indian Emerald Dove.

Order : Psittaciformes

Family : Psittacidae : Parrots.

180. *Psittacula eupatria nipalensis* (Hodgson) : Large Indian Parakeet.
181. *Psittacula krameri borealis* (Neumann) : Northern Rose-ringed Parakeet.
182. *Psittacula alexandri fasciata* (P.L.S. Muller) : Indian Red-Breasted Parakeet.
183. *Psittacula cyanocephala bengalensis* (Forster) : Northern Blossomheaded Parakeet.
184. *Psittacula himalayana* (Lesson) : Himalayan Slatyheaded Parakeet.

Order : Cuculiformes

Family : Cuculidae : Cuckoos.

185. *Clamator coromandus* (Linnaeus) : Redwinged crested cuckoo.
186. *Clamator jacobinus serratus* (Sparrman) : Pied Crested Cuckoo.
187. *Cuculus sparverioides sparverioides* Vigors : Large Hawk Cuckoo.
188. *Cuculus varius varius* Vahl. Common Hawk Cuckoo or Brain Fever Bird.
189. *Cuculus micropterus micropterus* Gould : Indian Cuckoo.
190. *Cuculus canorus canorus* Linnaeus : Cuckoo.
191. *Cuculus saturatus saturatus* Blyth : Himalayan Cuckoo.
192. *Cuculus poliocephalus poliocephalus* Latham : Small Cuckoo.
193. *Cacomantis sonneratti sonneratti* (Latham) : Indian Beybanded Cuckoo.
194. *Cacomantis merulinus passerinus* (Vahl) : Indian Plaintive Cuckoo.
195. *Chalcites maculatus* (Gmelin) : Emerald Cuckoo.
196. *Surniculus lugubris dicruroides* (Hodgson) : Indian Drongo Cuckoo.
197. *Eudynamis scolopacea scolopacea* (Linnaeus) : Indian Koel.
198. *Rhopodytes tristis tristis* (Lesson) Large Greenbilled Malkona.
199. *Taccocua leschenaultii sirkee* (J.E. Gray) : Western Sirkeer Cuckoo.
200. *Centropus sinensis sinensis* (Stephens) : Common Crow Pheasant.
201. *Centropus toulou bengalensis* (Gmelin) : Lesser Coucal.

Order : Strigiformes

Family : Strigidae : Owls.

202. *Tyto alba stertens* Hartert : Indian Barn Owl.
203. *Tyto capensis longimembris* (Jerdon) : Grass Owl.
204. *Otus spilocephalus huttoni* (Hume) : Western Spotted Scops Owl.
205. *Otus scops sunia* (Hodgson) : North Indian Scops Owl.
206. *Otus bakkamoena plumipes* (Hume) : Punjab Collared Scops Owl.
207. *Bubo bubo bengalensis* (Franklin) : Indian Great Horned or Eagle Owl.
208. *Bubo nipalensis nipalensis* (Hodgson) : Forest Eagle-Owl.
209. *Bubo coromandus coromandus* (Latham) : Dusky Horned Owl.
210. *Bubo flavipes* (Hodgson) : Twany Fish Owl.
211. *Glaucidium brodiei brodiei* (Burton) : Collared Pygmy Owlet.
212. *Glaucidium radiatum radiatum* (Tickell) : Barred Jungle Owlet.
213. *Glaucidium cuculoides cuculoides* (Vigors) : West Himalayan Barred Owlet.
214. *Ninox scutulata lugubris* (Tickell) : Indian Brown Hawk Owl.
215. *Athene brama indica* (Franklin) : Northern Spotted Owlet.
216. *Strix leptogrammica newarensis* (Hodgson) : Himalayan Brown Wood owl.
217. *Strix aluco nivicola* (Blyth) : Himalayan Wood Owl.
218. *Asio flammeus flammeus* (Pontoppidan) : Shorteared Owl.

Order : Caprimulgiformes

Family : Caprimulgidae : Nigntjars.

219. *Caprimulgus indicus hazarae* Whistler & Kinnear : Himalayan Jungle Nightjar.
220. *Caprimulgus indicus indicus* Latham : Indian Jungle Nightjar.
221. *Caprimulgus macrurus albonotatus* Tickell : Indian Longtailed Nightjar.
222. *Caprimulgus asiaticus asiaticus* Latham : Indian Little Nightjar.
223. *Caprimulgus affinis monticola* Franklin : Franklin's or Allied Nightjar.

Order : Apodiformes

Family : Apodidae : Swifts.

224. *Collocalia brevirostris brevirostris* (Horsfield) : Himalayan Swiftlet.
225. *Chaetura sylvatica* (Tickell) : Whiterumped Spinetail Swift.
226. *Apus melba nubifuga* Koelz : Indian Alpine Swift.
227. *Apus affinis affinis* (J.E. Gray) : Indian House Swift.
228. *Cypsiurus parvus batasiensis* (J.E. Gray) : Indian Palm Swift.
229. *Hemiprocne longipennis coronata* (Tickell) : Crested Tree Swift.

(To be continued)

Wildlife Conservation and Development

M.K. RANJITSINH

Wildlife conservation means differently to different people. In its fullest perspective it should imply the rational utilization of all wild animals, birds, reptiles, fish, insects, crustaceans, etc., and any aquatic or land vegetation found wild in nature which forms a part of their habitat. It does not only connote preservation—crucial though this may be in certain cases and in certain places—but the management of this resource on a sane long-term basis.

From the standpoint of short-term objectives, conservation and development are often at variance and competitive. From the long-term viewpoint the two are complementary. By abiding with ecological principles socio-economic goals can be achieved without entailing ecological disasters. The same applies with wildlife conservation.

A question may readily be asked as to why should scarce monetary resources and even scarcer land be set aside for the conservation of wildlife. The world's population today is over 4000 million. By the turn of the century it is expected to be a staggering 6250 million. How can arable land—man's most precious possession of all—be afforded to be set aside for conservation? Why should the resources of the sea be not utilized to the maximum for the benefit of man? Why should not the developing countries of the world fully and immediately exploit their natural resources for raising the standard of living of their people? The answer to these questions is that wildlife must be conserved not in spite of these factors, but because of them.

The subject of wildlife conservation may, for the sake of convenience, be broadly categorized threefold. Firstly, "areas" of strict preservation, including protection of species threatened with extinction; secondly, management of wildlife in areas exploited by man; and lastly, development of wildlife in areas not conducive to human use.

The first category is the most controversial in so far as it evokes the greatest emotions and sentiments as well as suspicions and anger. Creation of national parks and reserves has involved the curtailment of long-practised forms of human exploitation—grazing, fishery, collection of forest produce—and has often involved the relocation of human population. It has meant giving up or abstaining from very substantial forestry revenues by governments, and involving sizeable outlays on the maintenance of these areas which never "pay" to cover up their costs—no true national park, not even the most frequently visited by tourists, directly returns the annual monetary outlays that are made on them by governments.

Besides, what justification would there be, an economist or sociologist would ask, in setting aside arable areas while millions of landless starve outside, for wild animals which can, and sometimes do raid the crops and cattle of the local inhabitants.

What is often lost sight of is that land is not always set aside for preservation of animals only; that animals are often convenient and popular symbols for preserving important areas and eco-systems from being destroyed. The tiger which is the apex of the biotic pyramid was utilized in India as a rallying-point for conserving significant and diverse eco-systems in which not only the tiger but other animal and plant communities live. For, to preserve the animal one must preserve the habitat of which it is an integral part, and the habitat has to be an ecologically viable; entity to fulfil its role.

The advantages of preserving such habitats and other eco-systems are manifold. They protect for posterity areas which are in reality national and world heritages—from the viewpoint of aesthetic, recreational, educational, scientific, cultural, ecological and economic values.

Most people are aware of the aesthetic and recreational uses of national parks and reserves—that they protect natural wonders like the Grand Canyon in the North and the Iguacu Falls in South America; Mount Everest in Asia; and the Ngorongoro Crater, a microcosm of Africa. They have heard of the tens of millions who annually visit Yellowstone and other parks the world over; that wildlife tourism is the acknowledged number one source of national revenue in Kenya and potentially of many other countries. Contact with nature is not a luxury of the rich. It is a necessity for all school-going children to learn of the world of which they are a part, and for the city dweller to seek refuge from the stresses of his artificial environment. Psychologists agree that a human being who is attuned to nature is a much better citizen.

But there are more advantages than these. If man believes that he is the “ultimate” in evolution, that evolution is progress and progress development, man must ensure that there is no hiatus to this process of evolution. It is an accepted fact that evolution can only occur in a large and diverse community of plants and animals. By not providing these man is ensuring that there will be no further evolution of species, and therefore progress, in the world. Besides, these pristine areas are prime regions for scientific research. They provide the best and sometimes only information on biomass and carrying capacity of different biomes, energy turnover and conversion ratios, food and habitat preferences, evolution and speciation.

The parks and reserves also of course protect animal communities, and are in fact their last, and increasingly their only strongholds in the world. These animals are not only a tremendous world resource and heritage—no one who has seen the wildebeest migration in the Serengetti, the tiger in Kanha, the ibex in Gran Paradiso and the moose and caribou in

Mt. McKinley would deny that—but they also protect a large majority of the approximately 990 endangered species of animals birds, reptiles, fish and amphibians, and a substantial number of the approximately 20,000 of the endangered plant species. More protected areas will have to be established if these species are not to be lost for ever. National parks and reserves offer the best and often the only hope for the survival of these genetic resources, some of which whose importance and use have not even been investigated. Further, these areas protect the breeding grounds and migration routes of animals, birds and fish, whose economic potential is utilized outside these areas.

Strict protection of certain areas is also essential to prevent ecological disasters like floods and soil erosion. Utility periods of hydro-electric reservoirs, often built at stupendous social and economic costs, have been drastically reduced due to siltation caused by denudation and dessication of forest and grass cover. Floods in the plains are caused by these same man-made factors in the headwaters of the river basin, often hundreds of miles away. Roads and human habitations have been swept away and whole hillsides laid bare by landslides caused by inappropriate human exploitation. In these circumstances not only the wisest, but the only possible course of action would be to set aside such areas of crucial ecological significance as nature reserves and alter the land-use.

Economic and ecological considerations are also prime reasons for strictly protecting some aquatic ecosystems, today amongst the most desecrated and ignored areas of the world. Coral reefs provide not only gorgeously spectacular vistas of fish and plant life, but are highly productive regions and contribute very significantly to the food chains in the oceans. They provide shelter, succour and spawning sites to many species of fish. It is estimated that approximately one-sixth of the total world catch of fish come from estuarine areas. But if this resource is to be maintained or augmented, the mangrove and other vegetation on the shores would have to be strictly preserved, and the areas made safe from pollution and over-exploitation. The extraordinary fish catches, notably tilapia, of Lake Edward in central Africa are directly linked with the fertilization of the algae on which the fish feed, by the vast hippo populations protected in the adjacent parks and reserves. These are but few examples.

Areas of strict nature conservation form a very meagre percentage of the total areas of most nations of the world. In India it constitutes less than a quarter per cent of the total land areas, and in most countries it constitutes less than 3 per cent—quite a bit of it unsuitable for human use in any case. Thus areas actually set aside for this purpose are in reality quite infinitesimal in most cases, and even if all other considerations were waived and arable parts of such reserves converted to intensive human use, no significant impact on the national economy would result—and that too would be more than offset by the adverse long-term economic and ecological factors that would emerge. Besides, there is another aspect of nature conserva-

tion that is often ignored. In many nations of the world—especially in the developing countries, a proper survey of many non-agricultural lands have not been made to determine the best land-use for different areas. Till such a survey is done and such surveys need to be carried out immediately it is better to effectively protect these areas till it can be decided as to what best use these lands could be put to, rather than throwing open all these areas to immediate intensive use of some form or the other and losing them forever.

In certain cases it is not feasible to save a species from extinction by saving its habitat. In such instances a moratorium on hunting often involving the co-operation of international communities, is necessary. This is applicable to whales and other marine mammals and reptiles. The blue whale is the largest living being that has evolved on planet earth, exceeding 100 feet in length and 170 tons in weight. Their total population is today counted in a few thousand, a stark reduction from the estimated quarter million or more fifty years ago. Aesthetically, ecologically and ethically man as a responsible inhabitant of this planet, owes it, his only home, that no specie which has evolved with him in millenia of time is allowed to become extinct through his gross ignorance or avarice. Economically, many such species which have been so sadly depleted due to over-exploitation, could once again prove to be valuable economic assets if their numbers are allowed to be built up and a rational management policy is applied to them.

Wildlife conservation in the areas of the second category—where man largely lives and works—would require the greatest degree of management, of choices of land-use, and economic considerations. Conservation is often regarded as an antithesis to economic benefit, implying embargos and constraints. In reality, this need not be so. It is undoubtedly true that the interests—usually short-term—of man and wildlife clash in numerous instances. Once having ensured the survival of the earth's genetic resources and its heritages animate and inanimate, it will have to be conceded that the rest of the world's resources must be managed for the benefit of man. It is precisely here, in evolving a wise long-term management policy for the utilization of these resources that it will be found that wildlife conservation can co-exist with other forms of land use, that in many cases it is the best and sometimes the only land-use logical or possible.

Let it be said at the outset that renumerative cultivation and large herds of wild elephants or rodents for instance, cannot co-exist. Conversely, however, one does not have to take recourse to destroying the last wolf in Scandinavia or the last cougar in the midwest rangelands of USA to protect livestock. The fact, however, must be accepted that over the very large majority of the earth's surface man has to exploit, and what he needs to be shown—with the exception of areas of the first category—is not what he should not do, but what he should do instead. Thus if cultivation and wild pig or blackbuck cannot thrive together, snakes and many a specie of bird, to give only some examples, very well can. Snakes are

the greatest controllers of rat populations, and the contribution that they directly but unknowingly make to the agricultural economy of a country like India where more than 10 per cent of its cereals are destroyed by these rodents, far outstrips the economic benefit derived from the commercial exploitation of their skins. The weaver bird, often regarded as a pest, more than compensates the grain it eats by the insects which it also eats and which in turn cause greater damage to crops than the bird. Frogs and some species of birds also play an important part in the control of agricultural pests, and the Indian farmer of old, wise to the role of the black drongo in this regard, provided him with an artificial perch to attract him to his paddy fields. The role of the *Uromastix*—another exploited lizard species—in the control of locusts, and of many species of birds and insects in pollination, is too well known to be recounted.

A close study would reveal that not only can the larger majority of birds and many animals—exist on farm and rangelands without causing any, or hardly any damage to agriculture, but in very many cases they are an asset to it. Many farmers in Europe and America encourage the breeding of wild game-birds and even game-animals on their farm lands as a commercial proposition.

Indeed, it has been proved that in many agricultural areas of the world the productivity and economic returns from land would be greater if they were converted to wildlife management or game-farming. The reproduction ratio, adaptability to the environment and the efficiency in converting available nutrients into protein is much greater in wild ungulates than is the case with livestock, local or exotic. Besides wild animals do not destroy the habitat and livestock tend to do, and require much lesser care and outlay. The biomass supported by grasslands of Uganda, Tanzania and Zaire left to the wild ungulates, is exceeded only by cultivated meadows supporting livestock in the most favoured areas of Europe. On natural grazing areas the livestock biomass even in the best ranching areas of the world is about one-third the figures achieved by the wild ungulates in the central and east African savannah; while the biomass of livestock on the same grasslands is barely one-fifth. The unique Saiga antelope, so well adapted to its harsh environment in the USSR, was reduced to a few hundred specimens half a century ago. Carefully conserved, over a quarter-million animals are harvested each year providing some 11,000 metric tonnes of prime-meat together with leather, industrial oils, other raw materials and by-products. The percentage of meat obtained as against live body-weight of the animal is much higher with wild herbivore than with cattle. Besides, the fat contents in wild animal meats is far less and protein component much more than in livestock flesh. It has been calculated that with a meat yield of 60 per cent of body weight, the fat content may be as high as 28.4 per cent in cattle as against 0.3 per cent in wild animals, while there may be an excess of protein equivalent to 6,000 calories per 100 pounds of meat in the latter type of meat over the former. All these factors cannot be ignored by an ever-increasingly hungry world.

As has been mentioned at the outset, wildlife is confined not only to wild animate beings but to plants as well—both terrestrial and aquatic. One of the greatest tragedies perpetuated by man is the continuous and rapidly increasing rate at which he has destroyed the tree-cover on earth. By the mid-twentieth century the world's original forest cover had been reduced by almost half. By 1963, the FAO World Forest Inventory reported that only 29 per cent of the land surface of the earth could be considered as forested. Only about 13 per cent of it is under some form of management. The annual rate of deforestation, especially in the tropics, is increasing at a rate which could only be described as suicidal. Aerial surveys of the rain forests of the Ivory Coast show a reduction of 30 per cent between 1956 and 1966. The FAO estimates of annual clearance of forests for shifting cultivation only, to be 8.5 million hectares in Asia. An estimated 5 to 10 million hectares is deforested each year in Latin America, mostly for temporary farming. In the Philippines, official records show a financial loss of five billion dollars in forest-produce alone, from the 13½ million hectares deforested in the recent past. In the words of Paul Richards "Much of the plant and animal life of the tropics may thus become extinct even before we have begun to explore it— a vast realm of potential human experience"—and economic resources—"may disappear before there is even a bare record of its existence." At present only about 9 per cent of the tree species of tropical rain forests are regarded to be of commercial value. The rest are often allowed to go waste in forest extractions and clearances. Tomorrow these would certainly be of economic value with the demand of forest products expected to be doubled by 1985. Today they are of undeniable ecological value, and their destruction is tantamount to self-destruction.

The uses of forests both from economic as well as ecological standpoints, are perhaps too well known to be described. Let it, however, be said in brief that forests not only supply fuel, timber, pulp, fodder, fruit, tubers, and a thousand derivatives for medicines, chemicals and industry, and shelter for animals and birds and myriad life—forms, but they are responsible for preservation and formation of soils, for regulating the hydrology of the terrain and conserving the water-shed and thereby preventing soil erosion, siltation and floods. They also regulate the climate—rainfall, temperature and humidity—and purify the air by producing oxygen and absorbing carbon dioxide. The ecological benefits of forests are, therefore, of direct economic consequence, and both are essential for development and survival of man. By the rampant irrational destruction of natural vegetation man has only created and continues to create, deserts—physical, economic and aesthetic—and deserts today already cover one-third the land-surface of the world.

A question may be posed as to what could be done to appease the land-hunger of millions of the poverty-stricken; what economic alternatives to forest clearances could be offered in situations where jobs are scarce and economic infrastructure and resource-base not fully

developed? The answer lies in the better management and utilization of forests—not in their eradication. Experience has proved time and again that the lush forest cover of tropical forests belie the productivity of the soil—that the deforested land are unsuitable for cultivation and the shallow soil is eroded away soon upon the removal of the tree canopy. The havoc brought by shifting cultivation is too well-known. On the other hand forests are amenable to multiple consumptive usages, and if properly managed, can, without involving any substantial financial outlay, provide on a sustained-yield long-term basis economic returns many times greater than what are accrued from present practices including cultivation, without in any way damaging the ecological values of the forests themselves. It may involve however taking certain decisions on alternate land-use which may not be very politically palatable. Nor is the practice of large-scale plantations of single, economically viable tree-species the surest road to long-term economic valhalla. Foresters the world over are largely interested in only the tree species of commercial value—less than 10 per cent of the total species of plants. While management of forests would involve encouragement of certain species in certain areas, the long-lauded benefits of large monocultures are fast proving to be both short-term and illusory, especially in developing countries. The adverse effects on the hydrology, soil fertility, balance of nature and even water-shed management have offset the immediate financial returns. Very often the economic returns from subsequent plantations have trailed off due to soil impoverishment. Diversity and complexity are the very quintessence for the health of the environment. By simplifying the eco-systems man reduces their recuperative powers, and thus often destroys them.

The task of afforestation, let alone the prevention of deforestation, is certainly not a hopeless one as is often assumed—not even in over-populated developing countries. In no country of the world perhaps, was nature in such retreat as in China, after five thousand years of gross misuse. The hills were bare, devastating floods a daily occurrence, and a layer of yellow “loem” dust all-pervading. By 1963 in a period of less than ten years about 70 million hectares—almost 7 per cent of the country—had been replanted. By 1980's it is proposed to increase the forested area to 25 per cent of the area of the country. This Herculean endeavour is being carried out in a country faced with gigantic problems not because the Chinese find forests aesthetically attractive. It should provide a pointer to those nations who blessed with this great asset are wont ignore it, or worse still, wantonly destroy it in the name of development and progress.

The aquatic zones of the world, both fresh water and marine, possess an incredible wealth of life, and thus have tremendous potentialities as perpetual provenders for mankind—if managed wisely. The wetlands of the world—lakes, rivers, marshes, deltas and estuaries—are some of its most productive regions. Studies carried out in estuarine marshes in Georgia, USA, revealed a productivity of 10 tonnes of dry matter per acre. The highest

yield of wheat and corn obtained in Europe is about 7 tonnes of dry matter per acre. The productivity of most tropical and sub-tropical wetlands is even higher than that of the temperate. While central European fish ponds stocked with carp produce up to 1,400 pounds per year per acre, the yield from an acre of fish pond in south-eastern Asia is as high as 13,500 pounds per year; and could improve with better management. Wetlands provide food, shelter and breeding grounds to another great resource—migratory and other water-birds. Yet these very wetlands have been some of the most over-exploited and worst-polluted regions of the world, not to mention the virtual extinction some of them are facing due to drainage, irrigation and siltation. Pollutants and Eutrophication have rendered large stretches of the world's fresh waters sterile, while many more have had their productivity and their economic use to man seriously impaired. The destruction of the freshwater breeding grounds of the North Atlantic salmon in the past hundred years has reduced the total annual catch of this fish to one-tenth its former volume, despite improvements in fishing techniques. The Rhine in Europe and Lake Erie in America are but two examples. What makes the offence even more serious is the relative slowness of the power of recovery of these eco-systems.

The same stories of gross misuse and despoilation is repeated on the high seas, man's last great frontier and potential resource. As we still do not know enough about the ecology and the productivity of the oceans, caution and pragmatism is called for. What we find is quite the contrary, each nation vying with the other in exploitation of its resources and using it as a vast receptacle for garbage. The drastic reduction of the whales—and therefore its loss as a great world resource—is common knowledge. Man's greed has resulted in the severe depletion of another valuable food resource. The removal en bloc of marine turtle eggs—and an almost 100 per cent collection of eggs from the turtle rookeries is not a very difficult matter—has resulted in the serious depletion or even a complete ending of breeding colonies, thereby affecting the future food supply of the very people who depended upon it.

The fish resources of the seas are not as inexhaustible as they seemed—no resources are. Between 1950 and 1970 the world's fish catch despite intensification of fishing operations, and it more than tripled, rising from 21 to 70 million metric tonnes. In 1971, however, the catch fell still further in 1972 and 1973 to almost 65 million tonnes. In 1974 it was expected to be still less than the 70 million tonnes mark. The Peruvian Anchovy is one of the world's greatest fishing resource and the greatest bulwark of the economic of that country. Not only does it provide sustenance to a huge fishing industry, but provides food for the 35 million water-birds that nest off the shores of Peru. The droppings of these birds—the "guano", is one of the richest fertilizers in the world, and a great foreign-exchange earner for Peru. Over-exploitation of the anchovy—aided by the vagaries of the cold Humboldt Current—led to the collapse of the anchovy fishing industry, and the

severe reduction in the supply of guano. The resultant two-year ban by the government on fishing caused tremendous economic hardship for the nation and the individuals dependent upon the fish and the guano industries.

On the positive side, the oceans have recuperative powers and depleted resources can be restored, if given the chance. The Pacific halibut catch at the beginning of the century was 60 million pounds a year. Though the volume was sustained for a number of years, it was due to the expansion of the fishing fleet and exploitation of new areas, while the average catch per boat declined. In the 1920's came the crash, leading to research and a treaty between Canada and the USA regulating the annual catch. The situation gradually improved till by the 1960 the annual halibut catch by USA and Canada averaged around 70 million pounds.

Arriving at the areas of the third category, we find them to be zones most inhospitable to man—the vast hot and cold deserts and the Arctic and the Antarctic polar regions. In many of these zones only wildlife can survive or thrive. In others, though pastoral and other agricultural practices can and do exist, the most economic use practicable in many cases is through wildlife management.

The Tundras support vast numbers of Caribou and reindeer—and musk oxen in certain parts—all of which are a very significant resource. The vast flocks of penguins in the Antarctic are one of the only forms of life possible on these lands. The millions of seals and walrus that inhabit these polar waters have long been exploited—and over-exploited—and form the source of some of the main economic activities of these regions.

If these vast ice-bound polar regions of the world are to be of economic use to mankind in the future, it is essential that these renewable natural resources which they sustain are adequately conserved and husbanded. On the Pribilof Islands off the Alaskan Coast, the Northern Fur seal population was reduced from about 3 million in 1870 to about 125,000 by 1911, requiring the reduction of the annual hunting quota from 100,000 to 12,000 during this period. With strict conservation the number has built back to more than the original 3 million, and the annual seal crop from these islands alone is now more than 2 million dollars.

In the deserts and semi-deserts, both hot and cold, detailed investigations have established the fact that wild ungulates due to their greater adaptability to the harsh environment and their greater efficiency in utilizing the available nutrition, are far more suitable to the area as a commercial proposition than the marginal livestock farming practicable there. These lands can support a much greater biomass—and hence meat on hoof—of wild animals than of livestock, and while the former can live in harmony with the habitat the latter tend to destroy it. Animals like the oryx, guanaco and several species of gazelle can live without water or do without it for days. They could prove to be a very valuable resource if game-

farming and management principles were applied to them, instead of being indiscriminately slaughtered and their habitat destroyed. These arid regions also sustain plant species of great significance to the economy of the regions. The Acacias are but one such example. By destroying such vegetation not only is the capacity of area to sustain life directly affected, but the process of desertification is further intensified.

Game control for the Tsetse fly in Africa, the conveyor of dreaded "nagana" disease among cattle, has been another very controverted venture. In Rhodesia more than 700,000 wild animals had been killed by government hunters by 1960, with a view to deny the Tsetse the source of its food supply and thereby to control it. But the fly was not controlled and the land not rendered safe for cattle. The objective of livestock production is to produce meat. Instead of fighting the ubiquitous tsetse by destroying the wild ungulates on which it feeds, it would have been a far greater economic proposition to harvest on a sustained-yield basis the game herds that these areas support, and encourage cattle production outside the fly "belts".

Summing up, therefore the socio-economic costs involved in wildlife conservation are in fact quite insignificant. The argument for wildlife conservation is in reality an argument for a more rational land-use. No nation can hope to survive, let alone progress, by flouting basic ecological principles for long. But viewed even purely from an economic standpoint wildlife management is possible with other economic activities without in any way affecting those activities or impoverishing the land; and in certain cases, management of wildlife is the most suitable and potentially remunerative practice possible. What is required is knowledge of the capabilities and limitations of different areas of a country and the best use that they could be put to: a rational land-use policy based upon this knowledge; and the legislation and the political will to give expression to this policy. If this means taking harsh decisions by governments, so be it. Development does not merely imply extension of human settlements and intensification of exploitation for short-term returns. In the words of Mrs. Indira Gandhi "we must be able not only to choose our direction, but to know when to stop and where to turn".

It is in this context, therefore, that conservation of wildlife must be viewed—that wild animals, trees and other life-forms not only have a place under the sun, but are an integral part of the economy and well-being of the world. By destroying them man is only making himself and the world the poorer.

NOTE—The views expressed by me in the above article, do not necessarily represent the views of the United Nations Environment Programme. — Author

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The Phantom Killer of Dogadda

By

S.P. SAHI* AND M.M. PANT**

In the placid mountain folds of Pauri Garhwal swathed with stray red rhodendrons and verdant riverside valleys, the year 1977 began ominously with a tragic note. On January 23, soon after nightfall, a 9-year old girl, Prasanna, was lifted by an invisible carnivore from her very door steps in Mohan Pujari Village. The girl was later found killed and partly devoured. On the following night a 45-year old woman and a 12-year old girl were badly mauled in Ritud Village. Then followed a reign of terror that lasted well over 15 months during which period the mysterious killer struck repeatedly with spasmodic intermittance killing 14 people and wounding an identical number. A majority of its victims were young girls and adolescent females.

Those were the dismal months for the afflicted inhabitants over an area of 300 sq. km. comprising 100 staggered villages in the serene landscape of Lansdowne Sub-Division. Here, human activities were greatly disrupted and the terrorised inhabitants felt the shadow of death lurking in every nook and corner of their otherwise peaceful surroundings. Men, women and children scarcely ventured to stir out of their homes; the crops in the fields stood neglected, the barnyards were unattended and cattle languished in dingy sheds. Only in dire exigencies did the people move about during the day time and they moved about stridently in clusters. And long before the twilight they retrieved themselves to the safety of their dwellings behind locked doors and shuttered windows. And the grim pall of nightfall invariably prognosticated the diabolical prowl of the man eater in every hamlet, its evil eyes prying every hutment through streaked door lights. Such indeed was the plight and predicament of the beleaguered hill folks.

For several months the killer remained illusive and its mystery became a legend in the hills. Some thought it was a leopard or a hyena. Others believed it to be a tigress which had strayed far from her habitat. And yet many a village folk dreaded the killer as an outraged vampire whose vicious hold was most unrelenting.

The wily killer always struck the unwary. Never did it patronise the same locality twice. Its *modus operandi* was to strike with a wierd blend of stealth and speed. Invariably, it pounced upon its unsuspecting victims like a flicker of lightening and fizzled

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out of sight with the subtlety of thin air. Soon it came to be known as the killer of Dogadda or the Pujari leopard. The frequency and unpredictability of its depredations filled the entire populace with horror and trepidation.

The mounting tragedies in the vales and dales did not fail to draw prompt notice of the civil and forest authorities. Elaborate measures were soon launched to bring the killer to book. Many skilled shikaries were pressed into service and detailed in different directions. A number of wireless sets were deployed to facilitate intercommunication in the difficult terrain. Live baits were tied sporadically to tempt the killer to his doom. During the night, armed village volunteers were made to mount guard on strategic spots for the safety and morale of the inhabitants. The campaign against the unknown killer had been waged on a well nigh war footing. Yet the phantom killer remained mysteriously at large.

The clues derived from the killer's pug marks found imprinted on wet soils or improvised ash layers led to the killer's identity as a leopard.

A close examination of the injury marks found on the bodies of human victims invariably showed the deep puncture of a single fang. This led to the indication that the beast had only a single canine tooth operating.

The continued unproductivity of the entire campaign even after the lapse of a year's concerted drive led to further rethinking. Soon, the measures already in force were augmented by a new strategy. Four coops made of angle iron and iron bars with sensitised drop gates were installed in places more likely to be frequented by the killer. The historic coop that trapped the man-eater on the night of 6th/7th April, 1978 near Gohar *nallah* near Bagi Village between Bagi and Kandakhal, Dogadda, Garhwal was made of angle iron and bars, measuring 2.20 m $\times$ 0.47 m $\times$ 0.63 m. The cage is divided into two compartments: the smaller one, marked by a pup, for the bait, and the larger one for the man-eater. Each of these contained a live goat bait within and its exterior was immaculately camouflaged with brushwood and boulders so as to let blend the contraption with the local topography.

The contrivance remained abortive for almost a month. Then suddenly it came to yield results. One fine morning in April this year as the local forest staff visited the site one of the coops they found the gaping drop gate missing from its position. Its mechanism must have failed they suspected. As they scurried closer to the concealed trap, they missed a heart's beat on being suddenly assailed by what sounded like the sharp hissing of an infuriated python and the crackle of a riled feline. Then suddenly something grotesque seemed to stir within the benighted coop. And that something moved with the unique grace of a blotched Persian carpet suddenly come to life!

The capture of the leopard did not, however, lead to any great optimism about the possibilities of its being the notorious killer. Nothing would have been more preposterous

than to summarily assume that the captive was *ipso-facto* the killer of Dogadda. In a vast countryside the likelihood of any stray leopard walking into the trap could not be ruled out. Anon, the captive was conveyed to Lucknow where it was safely lodged into the Zoological Gardens. It was a full grown male weighing 85 kg., 2.55 metres round the curves and in prime of health.

At the Zoo, the leopard was subjected to searching examination. The ground pug marks recorded earlier in field coincided with those collected later from life. On a physical check up of the leopard it was found that all the four paws were bereft of their claws save the rear left paw which bore a single claw *intact*. The captive's jaws had only one canine tooth unimpaired (upper left), the other three being mere stubs. This directly substantiated the theory propounded earlier in field that the killer had only a single fang effective. Indeed, any beast of prey deprived of its offensive equipage—the fangs and the claws is more to be pitied than condemned !

Evidently, the leopard had taken to human eating not so much by choice as by the compulsion engendered by its physical incapacity. From evidence recorded, it is hard to conclude that the leopard had, in fact, turned into an inveterate man-eater. In between its human kills it remained unaccountable for long intervals lasting 1 to 3½ months. This leads to the belief that during these long spells the leopard must have subsisted on an assortment of animal preys, turning to human beings only when goaded by the pangs of desperate hunger. Such an assumption is amply corroborated by the leopard being finally tantalized to its doom by the bleats and blusters of the live bait within the coop.

The organisers of the campaign deserve to be complimented. In the history of wildlife this certainly appears a rare instance where a rogue carnivore has been brought to book in a whole skin. Moreover, the liquidation of the killer after it had claimed 15 human lives over a span of 15 months compares very favourably against the destruction by Jim Corbett in May 1926 of the man-eating leopard of Rudraprayag after it had claimed 125 human lives over a period of 7 years and 11 months. The notorious man-eater of Champavat—a tigress—could only be killed after she had taken a toll of 434 human lives.

The sportsmen deployed on the hunt must also be commended for exercising extraordinary restraint in the face of so grim a challenge. No doubt, during the peak stir of the campaign a couple of leopards and hyenas found under suspicious circumstances were shot. These slain denizens were later found to be innocent. Incidences of mistaken identity in such gruelling pursuits by no means reflect on the sportsmen. In a far flung and rugged terrain like Garhwal, such activities are often fraught with heavy odds and uncertainties. The magnitude of the task of registering an unobtrusive killer from a vast tract can well be compared with that of retrieving a needle from the proverbial hay stack. It certainly

redounds to the credit of the sportsmen that in this instance, nevertheless, mistaken identities were kept down to the bare minimum.

The identity of oneness between the mysterious killer of Dogadda and the captured leopard now in Lucknow Zoo are based upon certain tenable observations. The pug marks of the two have tallied beyond any doubt. The effectiveness of a single canine both in the cases of the killer as well as the captive and its identical position in the jaw marks constitute a unique coincidence unlikely to be commonly met. Further, the absence of any more human kill in the affected locality after the 28th March this year leads one to believe that the captured leopard is none other than the killer of Dogadda.

However, lest we tend to be hasty in our analysis, we must rely on time to come, for a positive proof. Meanwhile, let us keep our fingers crossed.

Who follow adventure must stare in the mirror of death:

Strange eyes they are sometimes, with always a secret behind,

Though hidden in fear or in wrath, like a leopard whose breath

Mingled mine where we fought in a tree until suddenly blind

Went those searchlights of fury and told me the fight had been gained

For scoring the bark as they slipped, his curved talons gave way

Till he fell to the earth with a thud, all his colour retained

And the marvellous curves of his muscular form where he lay.

So I laughed in the tree, as my forerunners laughed when they fought

But grew silent and cold while I wondered what lacked to my joy

For it might have been I who lay dead, and what else had I sought

But the skin of this creature to give to a girl for a toy.

—John Still.

Saving The Tiger

By

M. KRISHNAN

Recently it was suggested that in the effort to conserve the tiger in India (the country in which, in spite of severe depletion of its environments, prey animals, and numbers, it is still present in adequate remnant populations), biotelemetry and foreign experts should be utilised to gain a fuller knowledge of its home range.

I do not think this is the time for such experimental field investigation, or that such means can give us any really useful idea of the home range of the threatened tiger. Let me explain the basis for my view.

We are seeking to conserve the tiger in our country mainly in two ways. The first is by banning its hunting and the sale of tiger skins, with legal sanctions provided for the ban. The second and more constructive measure is Project Tiger, and its possible extension to more reserves. The project is based solidly on total environmental conservation, on the proven ability of nature (where it has not declined irreversibly) to regain and maintain its own balance, provided it is assured of **lebensraum** and the removal of impinging depletive human influences.

Towards this end, tiger reserves in very different parts of the country have been set up, all of adequate area and still rich in varied wildlife, and human disturbance is being eliminated (or in parts of a reserve where that is not possible, minimised effectively) in them. Obviously, this is much more a human problem than it is a faunal or floristic one. In our country today, where human enterprise has penetrated the deepest forests in diverse and ramified ways, even in the selected reserves this is no easy task, and patience and perseverance are essential to success. Naturally, in tiger habitats outside these project reserves, conditions are even more disturbed.

The basic aim of the project is protection from human disturbance of all kinds (which profoundly affects all wild animals and even the wild vegetation), and already some substantial, even some unprecedented, protective work has been achieved in these reserves, but much still remains to be done, and can be done only by sustained and gradual implementation—this is an ambitious, long-term project. Experimental field investigation now can only add to the prevailing human disturbance, whatever its protagonists might say.

What is the home range of an animal and what can we hope to get to know of the home range of tigers in India by telemetry at this stage of our effort? To answer this question, we must consider what we already know definitely about tigers in India. Unlike the lion, the tiger is not given to gregarious associations, and is solitary by nature—that does not mean that a tigress and her cubs, or siblings, may not go about together for a year or two or that even when adult, brief associations of this kind may not exist, but by and large

it prefers solitude. Unlike some other animals (barking deer, and sambar in most places, for instance) it is given to ranging far, and not usually along established trek routes like gaur and elephants. However, it may sojourn for varying periods, even for years, in a forest free from disturbance where its natural prey supply is assured—artificially provided prey, like live baits, lead to aberrant behaviour from which we can gain no idea of the predator's innate proclivities.

But even in undisturbed and congenial environments (as existed in the past), factors like seasonal changes and the periodic movements of prey species, profoundly affect the movements of tigers. Where the forests are degraded and disturbed by human activities, not only the tiger but also all other animals tend to shift ground unpredictably. Where, then, is the point in seeking to determine the "home range" of a tiger in such circumstances, where its movements vary so much and are subject to so many variables?

Apart from all artificial factors that affect our wildlife, the terrain, ground cover (especially the shrubs and tall grass cover), water sources, the native prey animals of the area and their distribution and movements, all affect the range of tigers, so that in different settings totally free from human disturbance, tigrine movements tend to differ widely. Furthermore, as those with field experience of wildlife in our country will know, where the regional population of a species has been much reduced artificially, the animal's movements tend to be erratic.

Another relevant fact is that not being a strictly locally resident animal, tigers move from one environment to another in the course of their lives, such shifting of ground being governed by such unpredictable factors as droughts, floods or epidemics—and the same tiger exhibits quite different "ranges" in different haunts! Even such variables as its age, weight, mating urge, temperament (it is well known that tigers differ much in temperament), current health or even naturally caused wounds may cause a tiger to leave its so-called home range.

There are other considerations, "but since a man must make an end", let us not go into them. Is it not possible, without the utilisation of telemetry, to gain some idea of the movements of the tigers in a reserve? In the prevailing circumstances, telemetry inevitably involves much disturbance, not only to the tiger caught and collared, but to the entire fauna of the area also, by the movements of the human investigators tracing the beeps. It is true that quite apart from the question of any fixed home range, it is useful to know the day-to-day movements of individual tigers in a reserve, or at least their movements at brief intervals.

Telemetry does provide the most definite, and from the point of view of the investigator, the most convenient, information in such matters, but if only the investigators will take the pains to acquire not-too-difficult skills, the aided eye can yield information that is quite

reliable. Tigers are heavy animals and cannot help leaving their footprints behind on receptive surfaces in the course of their wanderings. Expert trackers can identify the pug-marks of individual tigers reliably, and if more reliable means are thought necessary, a method of scientifically analysing pug-marks is within the reach of anyone willing to learn to use a fixed-focus camera, securely mounted on three rigid legs and with its focus set at, say, 1/2 metre, the legs assuring separation by that distance between the lens and the earth.

By analysing enlargements made of the same size (a fixed-focus enlarger is even easier to rig up) from these photographs of different pugs (all necessarily taken to the same reduction in size) it should be possible to know, for certain, something about the daily movements of particular tigers and even to know when they have left for "fresh fields and pastures new."

"Of the world's surface, only eight to ten percent is at present used for food production. Pioneer agriculturists and scientists have demonstrated the feasibility of growing food-yielding trees in most unlikely locations—rocky mountain sides and deserts with an annual rainfall of only two to four inches. With the aid of trees, at least three quarters of the earth could supply human needs, not only of food but of clothing, fuel, shelter and other basic products. At the same time wildlife could be conserved, pollution decreased, and the beauty of many landscapes enhanced with consequent moral, spiritual, and cultural benefits."

—Dr. Richard St. Berbe Baker.

Irula Wildlife Co-operative

By

ROMULUS WHITAKER

Director, Madras Snake Park Trust

Introduction

The Irulas of Chingleput District, Tamil Nadu are scattered in small family or clan units of one to fifteen huts generally located on village edges. There are about one lakh Irulas in the District and the following outline is a proposal of self employment for the Irulas of this region, utilising their hereditary knowledge and skills. To briefly outline their lifestyle, they are hunter-gatherers who have lost most of the original wildlife resources on which they once subsisted. Formerly "VILLIYANS" (bow men) there is now no large game, but the free life of the hunter is too strong in most Irulas to join the rank and life of the farmer class, factory or road labourer. Rats, not deer or wild boar, are now the Irulas main mammalian meat source. They learn rodent natural (1) history the hard and thorough way, almost from the time they can walk. Irula children are taught the fine arts and "soft technologies's" of rat-hunting, snake catching, honey collection, termite collection etc. from a very early age. The advent of the snakeskin (2) industry was a godsend to the Irulas who are respectful of, but do not fear reptiles. They have perfected the extremely difficult and risky art of snake finding and snake catching with a finesse unrivalled anywhere in the world. Loss of wildlife resources has caused Irulas to scale down their hunting targets. Long ago they observed that most forest animals and birds are attracted to termites (3) at swarming time. The Irulas found termites to be tasty and protein rich (which they are !) and perfected an ingenious method of luring them out using a herbal pheromone attractant.

The Irulas like to be self sufficient and many specialize in knowing the plant species (4) which are edible or medicinally valuable. Some of these Irula "country doctors" have excellent, deserved reputations. Several college zoology professors have realised the value of an Irulas assistant attached to the department (5). The bio-supply dealers (6) have all made their profits by using the cheap, highly skilled abilities of Irulas.

Problem and Proposal:

The Irulas are losing further ground as hunter/gatherers. The recent government restrictions on snake skin and frog leg export are hitting them hard and alternative employment is simply not available. Some Irulas find work at harvest season but in general the picture is bleak.

It seems logical that the specialized skill and knowledge of the Irulas should be recognized and organized in a productive manner for their community. So far they have been utterly exploited by the majority of industries they have served such as the snake skin industry. It is proposed that an Irula Wildlife Co-operative be formed to a) provide a profitable product outlet for Irula-hunters and collectors (b) generate and undertake studies on sustained yield use of wildlife resources (c) provide essential services such as health, education and savings/loan facilities in the specialised manner required by the Irulas. Emphasis will always be on self help with technical guidance only where needed (i.e. reducing danger of snakebite to catchers through revised capture techniques).

Irula Wildlife Co-operative

The Co-operative will be maintained mostly by the Irulas themselves with an experienced Manager from outside. Subscribing members will get a share of profits from immediate sale and his balance invested for health, insurance and savings.

Some of the areas in which the Irula Co-operative can be effectively profit making for its members now, are:

1. Snake venom
2. Rodent control, snake control
3. Termite control
4. Herb collection
5. Biological supply
6. Technical field assistance

Areas which will be examined for further application by the Co-operative are:

1. Deer ranching
2. Leopard farming
3. Frog Farming
4. Fish Farming
5. Butterfly and moth farming
6. Crocodile farming
7. Monitor lizard farming
8. Python farming
9. Sustained yield snake skin use
10. Honey collection
11. Horticultural supply
12. Pest control methods (biological)
13. Wildfowl farming
14. Wildlife tourism
15. Turtle farming (marine and freshwater)
16. Evaluation of tribal medicines

1. *Snake Venom*: In India the only large scale use of venom is by Haffkine Institute, Bombay and Central Research Institute, Kasauli for antivenom production. In other parts of the world venoms are used by biochemical and microbiological labs and pharmaceutical companies in enzyme research as pain relievers, blood coagulants and for many other purposes. Venoms are valued from US \$ 20.00 per gram for common snakes like the cobra up to US \$ 100.00 for some of the varieties more difficult to obtain.

Since the Irulas are the catchers of the raw material (the most difficult and specialised part of the operation) they can be the suppliers of venoms at the most reasonable rates with the greatest distributed benefit. For several decades they have been the main suppliers of the krait for Haffkine's antivenom production. *There would be more profit for the Irulas and a lower overall venom cost to Haffkins if the tribals could supply the venom rather than the snakes.* To achieve this would mean (a) Haffkine's approval and (b) a basic venom processing unit in Madras.

Few snakes survive longer than 3-6 months of bi-monthly venom extraction. If status studies indicate that snake capture for the venom is detrimental to snake populations, a release programme will be started for all snakes after 4 extractions (after which venom yield usually drops as health deteriorates).

The international demand for Indian venoms is considerable. The reasoning behind the banning of snake venom export in 1969 while allowing the annual export of 10,000,000 snake skins was hard to fathom. A small scale industry venom production set up, based in Madras, can easily produce the country's venom needs plus a surplus for export. It will have the advantages of providing for a tribal community and will be monitored by ongoing studies supported by income from the potentially profitable Irula "soft" industries.

2. *Rodent Control, Snake Control*: There is no question that Irulas are the most efficient snake catchers available. The control of rodents by the Irula's direct capture methods can surely compete with the trap, poison bait and poison gas methods of modern Pest Control agencies. On Agatti Island, Lakshadweep in November 1976 a Warfarin, aluminium phosphide, zinc phosphide campaign against rats costing about Rs. 35,000/- resulted in a kill of only 2500. It cost Rs. 14/- to kill each rat! The only one happy about it is the well known, Bombay based pesticide company who supplied the poisons.

Irula rat catching techniques vary according to the species and habitat but include: snaring, netting, digging out and smoking out. Their excellent knowledge of rodent natural history enables them to gauge infestation levels and optimum times for capture. A preliminary rat catching programme by Irulas in a infested agricultural district near Madras will give an indication of the economics of the soft, biological approach to rodent

control which provides an alternative to dangerous poison and more important, large scale employment for Irulas.

3. *Termite Control:* Irulas have had generations of appreciation of termite natural history. An experienced Irula hunter can produce a queen termite within a very short time from most live mounds. Sometimes a colony in a mound contains a second queen. By removing them the Irula effectively kills the entire colony. This is another operation which must be weighed against the current use of pesticides. I feel that with the personal attention of annual followups, the Irula methods would prove effective, as economical and much less hazardous than the poisoners.

4. *Herb Collection:* There are a considerable number of valuable spice and medicinal plants in the plains and low hill scrub jungles of the Irulas' habitat. Irulas, like many other groups, mainly need help in fair marketing of these collections.

5. *Biological Supply:* This is a fairly large trade involving at least 5 full time companies in Madras. It used to cater to the foreign preserved (and sometimes live) animal market but with the recent controls it mainly supplies specimens for college and school, museum collections, study projects etc. The "companies" are basically middlemen who buy the frogs, lizards, snakes, birds, fish, leeches etc, from the Irulas, inject them with the preservative formalin and put them in a labelled jar for a tremendous price markup. This educational use of smaller forms of wildlife can be a lucrative trade but again should be subject to the same scrutiny and monitoring as any proposed sustained yield wildlife resource usage.

6. *Technical Field Assistance:* Naturalists throughout the tropical parts of the world have found their hard field labour halved or quartered by the assistance of a nature-wise indigenous tribal. In many areas much of the important nature lore is being lost. Even among the Irulas, only a portion are still even part time hunters gatherers. There are college zoology and botany departments and other organizations with a direct link to wildlife resources for study and/or utilization all over the country which could benefit from the services of an experienced Irula hunter. The mechanics of employing people so traditionally fond of the open life is a delicate operation in many cases. Often however the job can be very similar to occupations the Irula loves best—seeking animals for specimens, observation of habits, and other, totally field-oriented jobs.

For Future Application

A prerequisite to the formation of a wildlife utilization co-operative is the establishment of a research base which will eventually be responsible for surveys and monitoring of all species under exploitation. The co-operative will thus need a physical base on a suitable

site near Madras and at least a modest team of energetic specialists to establish and co-ordinate the modus operandi.

There are many more aspects to be touched and, considerable details to be worked out before the Irula Wildlife Co-operative can become operative. It can be a state sponsored project with several individuals and institutions playing advisory roles. Some of the initial areas of operation and interest with their suggested advisers are:

1. Venoms—Dr. B.B. Gaitonde, Director, Haffkine Institute, Bombay.
2. Rodents—Dr. Prakash, Director, CAZRI, Jodhpur.
3. Reptile farming—Dr. H.R. Bustard, Consultant, FAO/UNDP, Hyderabad.
4. Technical field assistance—Dr. Madhav Gadgil, Indian Institute of Science, Bangalore.
5. Termites—Pest Control.
6. Biological supply—
7. Herb collection—

The Co-operative may be set up on the following initial lines:

Administration

1. Products and Sales
2. Irula Welfare

Research and Development

1. Permanent Wildlife Research Station
2. Ongoing status surveys and study programmes.

“When the forests go, the waters go, the fish and game go, crops and flocks go, fertility departs. Then the age-old phantoms appear stealthily one after another—Flood, Drought, Fire, Famine, Pestilence.”

— Robert Chambers

Project Tiger and Simon Winchester's Crooked Mirror

DR. R. N. MISHRA

'Shooting down paper tigers' published in the Guardian, London in March has evoked a controversy and become 'a matter of dispute' and so the Guardian does not permit its reprinting here though it has been reproduced in a Bombay weekly and in some other papers in India to the great detriment of the most praiseworthy and largely successful national effort partly supported by World Wildlife Fund, to save the Indian tiger—our National Animal, from extinction. It is unfair to the dedicated workers in Project Tiger, to the Government of India and even to the World Wildlife Fund.

Simon Winchester "reveals the findings of a report which was suppressed by Indian Authorities (I received a copy of the report for mere asking). He presents a distorted picture minimising the achievements and highlighting the failures (if any). The target of attack being Mr. K.S. Sankhala—the then Director of Project Tiger in particular and the Field Directors and workers in general, thus denigrating Indian expertise involved, and conveniently forgetting that most foreign experts have only very limited opportunities and time at their disposal and depend mainly on hearsay and the information they may be given by the workers involved—workers who have been born and bred in tigerland.

Simon Winchester may not agree with the style of working of Mr. Sankhala who is a trained Forest Officer, a naturalist in his own right, an award winner of Rajasthan Government for his work on the Rajasthan Tiger before he became Director of Dehli Zoo. He is a recipient of a Nehru Fellowship for research on tiger, an eminent and world renowned wildlife photographer with a number of publications to his credit and his latest book 'TIGER' published by Rupa Collins is a landmark in wildlife literature. This book has been referred to by Simon Winchester as a "heavily illustrated bearing his name as author". Most of the Field Directors are senior Forest Officers who with their subordinates form a team of dedicated workers not easy to get together. Personal likes and dislikes should not come in the way of judging the success or failure of Project Tiger.

Simon Winchester writes of introduction of politics in Project Tiger in the "ever receptive India Press" little realising that his writing prompts Project Tiger to be partly painted now as an 'Emergency excess' and to be 'shouted down', without verifying facts from reliable sources.

The article deserved to be ignored but enquiries from members of Wildlife Preservation Society in India and abroad compell attention. Reproduced below are some rejoinders to the article by persons who matter in wildlife in India—from Dr. Karan Singh former Chairman Steering Committee, Project Tiger, S.K. Seth, former Inspector General of Forests, S.R. Chaudhuri, Field Director Simlipal Tiger Reserve and other Field Directors, M. Krishnan, a renowned naturalist and wildlife photographer, S.P. Shahi, former Chief Conservator of Forests, Bihar. The Official position of World Wildlife Fund (India) as discussed at a meeting of the Board of Trustees of the organisation, who met recently in Bombay is also given. A letter to the Editor 'Times of India, from Peter Jackson, Director of Information, WWF, Morges, Switzerland explain the situation. It is left to the readers to judge for themselves. The consensus appears to be that the article is unfortunate, ill timed and jeopardises the survival of favourable opinion to save the vanishing tiger.

The summary of the Report runs, "The authors wish to confirm at the very out sit, however, that Project Tiger has already achieved a number of quite outstanding success in furthering the Indian Tiger's chances of survival and that reflects great credit as all who have been associated with it."

The constructive suggestions in the report deserve all attention. The rejoinders that follow put the Project Tiger in correct perspective to ensure its success and to help save our vanishing national heritage.



On 'Shooting Down Paper Tigers'

Mr. Simon Winchester's distribe, *Shooting down paper tigers*, in The Guardian for March 22, is uninformed, probably incorrect in many assumptions, and obviously motivated by hearsay : moreover it exhibits a basic noncomprehension of the way Project Tiger is being implemented. A detailed contradiction of such prejudiced criticism is worth no one's time, but some flagrant mis-statements should be pointed out, to justify my opinion of it.

Although the article singles out for mention unfortunate Dr. Karan Singh (who has done so much for the conservation of wildlife in India) and K.S. Sankhala (who has worked hard for Project Tiger—incidentally, he is a fully qualified forest officer and a naturalist in his own right, and no mere Zoo Superintendent) it can be construed only as an attack on the Government of India's running of the Project—with no comprehension of constitutional difficulties! The Central Government is contributing about 4/5 of the cost of the project during its first period (the rest being the contribution of the W.W.F.), and is naturally in over-all charge : but all the tiger reserves are in State Government forests and manned by State personnel, and under the Constitution of India the day to day administration of even such Centrally financed schemes has to be by the State authorities. This basic fact has been lost sight of at times by the "three-man team of cat experts" (as Mr. Winchester mistakenly terms the team—only one, Dr. Leyhausen, has any pretensions to expertise in the matter, and even he knows much less personally about wild tigers than quite a few of us) whose recommendations to increase and implement protection more effectively no conservationist will differ from—in fact, this report is constructive and sincere, in spite of its failure to appreciate constitutional limitations and a few minor faunal and floristic errors. The truth is Project Tiger involves a human problem much more than a faunal or floristic problem. Its main aim is to eliminate poaching and human disturbance in the carefully selected and adequately large tiger reserves, to give nature a fair chance to recoup—this is a project solidly based on total environmental conservation and trust in nature's ability to maintain its balance, given adequate territory.

The Steering Committee, its Chairman, and its Member-Secretary (the Director in Delhi, whose function is mainly that of a liaison officer, specifically assigned some field work) can only offer, in addition to the prime inducement of finance, guidance from afar, advice and exhortation to those actually in charge of the tiger reserves, and have no direct administrative control. To make this point briefly, a decision of the last meeting of the Indian Board for Wild Life (with Mr. H.M. Patel in the Chair—he is also the Chairman of the Steering Committee) may be cited—a proposal to bring all National Parks and sanctuaries in the country under Central Government control was rejected as it would entail changing the Constitution of India. To make my point explicitly, I may quote the

penultimate paragraph of an assessment of Project Tiger I wrote, published in 1977, long before the Guardian article was:

"Will Project Tiger succeed? One may answer, but how can it fail, being so solidly based on nature's ability to recoup and maintain its own balance, provided depletive factors (all stemming from human activities) are removed, as the project plans to, and adequate territory is provided, as it has been? But, of course, it can fail. Any plan, however soundly conceived, can fail in its execution, not only out of lack of care, or ineptitude on the part of the people in charge of it, but also out of over-much eagerness to get results. This is a project that needs much patience, and faith in nature, and unceasing vigilance, especially in protection, a long-term scheme that will take at least another decade to succeed or even to fail. It is now very much in the hands of the participating states, and only time can show how well they have discharged their responsibility."

To say that in the past 5 years nothing has been done and that only now something will be, thanks to the recommendations of the 3-man team, is preposterous, and enormously ignorant. The selection and enlargement of the tiger reserves to their present extent was no small achievement in itself, and the contribution of the participating States in discontinuing forestry operations in large areas so as to provide sufficiently large core areas has been a most generous and constructive one. In many reserves, long-established villages within the forests have been evacuated by the offer of larger and better holdings outside the reserves and substantial help in establishing homes in these new settlements—voluntary surrender of human intrusions to the forests, unparalleled in Indian history. Cattle grazing inside the reserves, a most deleterious and insidious influence, has been eliminated in the core areas. Protection is being slowly strengthened.

As one associated with the Steering Committee from its inception, I know how unjust the attacks on Dr. Karan Singh and Mr. Sankhala are, even in these days when personalised polemics has spread from politics to every field of wildlife, especially to international wildlife effort. Dr. Karan Singh was never in charge of the Ministry of Agriculture, which is the only Central Ministry which has some responsibility for the effective implementation of the Wild Life (Protection) Act: as the Chairman of the IBWL he did everything he could to induce Kashmir, chief centre of the fur trade in India, to adopt the act, and I believe that in the year of the new rule, too, they have not been able to persuade the State to adopt the act. Does not Mr. Winchester know that tiger skins can be bought under the counter in London, too? As for the scornful prepublication reference to Sankhala's "heavily illustrated book", unlike Mr. Winchester I have seen chapters of it (in typescript) and the photographs being offered for it: I think that when it is

published it will be the most carefully documented and best illustrated book so far on *Panthera tigris tigris*.

The exaggerated figures for increase in tiger populations, so sweepingly condemned, merit deeper thinking. These figures were provided by the State authorities, mainly on pug-counts. Statistics, as Disraeli pointed out so tellingly ("lies, damned lies, and statistics"!), can be most misleading, even if meticulously collected, unless intelligently assessed. In a reserve with an initial population of about 20 tigers, three litters can increase the population as much as by 50%, mortality not being always infantile. Moreover, no doubt tigers from the heavily disturbed peripheral areas moved into the comparatively peaceful core areas of the reserves.

Lastly, the alleged sinful waste of money on gimmicks. The cameras were chosen and bought by the W.W.F. and, in my opinion, are essential equipment for such a project. As one who has supplemented and complemented his field observation and photography in the forests of India for over 25 years, I know how valuable photographs (even if technically poor) are as records, in providing reliable material for ecological and biotic studies and as records of settings, associations, feeding habits and in other ways, even as statistics.

M. Krishnan

The article on Project Tiger by Simon Winchester carried in the Guardian dated 22nd March has just come to my notice. I was surprised and shocked to see the piece, which is heavily biased and seems to be directed solely towards denigrating one of the most remarkable conservation projects undertaken anywhere in the world. As Chairman of Project Tiger for several years, I can claim with confidence that it has done immense good to the areas covered by it. Human populations have been shifted; stock grazing and forestry operations have been curbed in the core areas of several tiger reserves to improve the ecological environment, and a number of measures taken to prevent poaching. There can be no doubt whatsoever that the number of tigers in the project areas has increased. The Government of India which undertook this project with valuable aid from the World Wildlife Fund, has recently added two more Tiger Reserves to the nine earlier ones.

Scientists and experts often hold mutually contradictory views, and the 'cat experts' who come to India on short visits but have seldom if ever actually lived in tiger areas for any length of time, are certainly free to express their views. However, it would be entirely

wrong to conclude that the project has failed just because some of these 'experts' may not be fully satisfied. The tiger is India's national animal and we are proud of 'Project Tiger'. This is not the subject of any political controversy in India. It is deeply regretted that your esteemed paper should have thought fit to carry such a one-sided presentation which is a gross slander on the hundreds of dedicated men who have worked day and night for many years on this project of national and world importance. It is also unfair to the World Wildlife Fund which has always been kept closely informed of the progress in the project.

Dr. Karan Singh
(Letter to the Editor
The Guardian, London)

I congratulate Simon Winchester for writing and congratulate you for publishing the article captioned 'Shooting Down Paper Tigers' in your esteemed paper dated March 22, 1978. I am really glad to note the importance attached by you to tiger. This indeed is a happy augury.

At the outset I may state that till October 1977 end, I was Inspector-General of Forests, India (and not Director General of Forests) and in that capacity I was directly incharge of the Project Tiger, India since March 1975. Now as certain observations of Mr. Winchester are not based on facts, I take this opportunity for enlightening your readers. The issue involved have wide implications and I would be failing in my duty if I do not write to you.

Mr. Winchester's amusing comment about the launching of the Project on "All Fools Day" is not at all in good taste. The first day of April may be 'All Fools Day' in Europe. For India it signifies the first day of the official financial year and as such is an auspicious day for all purposes.

The former Director Tiger Project, Mr. Kailash Sankhala never resigned. He is still very much in Government service. He was on deputation to the Government of India from Rajasthan State for twelve years and the State Government insisted to have him back with them for developing wildlife potential of Rajasthan. So much for the alleged resignation.

Coming to the number of tigers in the reserves, the claim made by the project is in no way exaggerated or extravagant. The Chairman of the Project Tiger has admitted in the last meeting of the Indian Board for Wild Life that the number of tigers has increased and they are straying out of the reserves. It has also been recognised by the Project that protection offered by the reserves may have induced a few tigers to move in from outside.

The criticism relating to rate of increase of tigers offered in the article is perhaps based on Leyhausen's opinion. The lion in the Serengati reproduce at the rate of 6-8 percent and

all zoos are aware that tiger breeding in zoos is profuse. What would you say of 55 cubs of less than one year actually counted in the tiger reserves last year, where the total population was only about 400? The 2 percent rate of increase of tigers in the Tiger Reserves mentioned by Paul Leyhausen is baseless as he has not adduced any evidence in support of his claim. It betrays lack of experience of the conditions of Tiger Reserves.

Mr. Winchester's contention that at this rate India would embrassingly be infested with tigers is fanciful as he is confusing tiger population in the reserves with that in the country as a whole. Again, even if the increase did take place all over, which no one has claimed, was India stiff with tigers at the turn of the century, with 40,000 of them around? Even a 6-8 percent rate of increase throughout the tiger country would never be able to take us to that figure as there is no chance of human population remaining static and the habitat has shrunk considerably.

Mr. Winchester has referred to "Leyhausen" Committee as having three Cat Experts on it. Only one of them was a Cat Expert but certainly not a tiger expert. None of them have studied cats in India much less the tiger. The total number of days spent by them in the nine reserves did not exceed even 40 including journeys to and fro. Mr. Sankhala, the former Director Tiger Project has, on the other hand, spent all his life with the tigers of India both in the wild and in captivity. The committee, lamentably though admittedly relied on secondary data collected during their previous visits prior to the start of the Project Tiger, which are hardly relevent in today's context. Finally the so called Leyhausen report was never suppressed, it was immediately circulated widely in India and is available to anyone interested enough.

I may add that over 30 Indian experts including Mr. B.P. Srivastava met at Delhi to discuss this very report. Their unanimous verdict was that the report did reflect a lack of understanding of the Indian conditions in which the Project Tiger was conceived, and has been operating.

It is difficult to understand that a conservation project does not need equipment, but to call pocket calculators (which even students use) and cameras as a lot of fancy equipment is certainly exaggerated. Anyone who has been engaged in research—especially monitoring of fauna and flora will appreciate the indispensability of bench mark photographic records.

The equipment was not purchased by the Project Tiger. It was purchased by the WWF from outside India and donated to the project. Obviously, the importance of these instruments as aids for the endeavours to save the tiger must have dawned on the WWF experts.

Mr. Winchester has conveniently omitted the good points of the Project mentioned in the 'Leyhausen report'. The report stated in unequivocal terms "that much of the success of the project in its first three years had been due, not in a small measure, to the unflinching enthusiasm and efforts of the Project Director." In the considered opinion of the Committee the task that the Director of the Project had been required to undertake was too large and too complex for one man to accomplish successfully. Yet Sankhala was able to do it.

Even on wildlife numbers Mr. Winchester has resorted to selective quoting. He forgets to mention that the experts had no cause to doubt the evidence of improved protection of wildlife compared with previous visits, and that the trend in most wildlife populations in most of the reserves had improved. He has deliberately skipped over the observation that one of the most successful operations to be undertaken in the Project was the movement of villages from some core areas to localities outside the Reserves and these moves were effected without friction because of good planning and excellent co-operation between the Project territorial staff and the administration. Similarly, the report termed elimination of stock grazing from the core areas as a highly successful operation undertaken in the Project Tiger. Practically all core areas were afflicted with serious grazing problems and most project staff had to be involved in their elimination.

Mr. Winchester has highlighted Mr. Sankhala's visits to Switzerland. He was perhaps not aware of the fact that these visits were not from India on Sankhala's initiative but they were in the first case from London and in the second from Geneva Airport and that too on the invitation of the Headquarters of WWF.

The tiger is in trouble, says a zoologist according to the article. Who, pray, was this zoologist and why does Mr. Winchester not want to name him? Is the name not worth mentioning or is it a fantasy? Had he taken care to talk to a field zoologist like Dr. Malcolm Coe of Oxford University who has visited a number of tiger reserves and seen for himself the work being done, the reporting would have been accurate, useful and objective.

The caption "Shooting down paper tigers" is imaginative and apt indeed. But don't you think paper tigers do deserve to meet this fate. The Project Tiger, however, was and is for real living tigers and not for the paper tigers. What intrigues me is the publication of this article at this time exactly after a year of the change of political climate in this country.

It is a pity that Mr. Winchester should stoop to the extent of saying that an illustrated book bearing Sankhala's name as author was being published. I have read Sankhala's manuscript. Why has Winchester chosen to be so uncharitable to Sankhala? When I read the final draft of Sankhala's book, I felt I was immensely benefitted by the exhaustive and penetrating study. The book, when published, will I am sure, dispel the doubts raised by

Mr. Winchester as Sankhala's painstaking and brilliant research findings are based on first hand information collected by him. I must say, I have yet to come across such an authentic book on tiger.

I am sure you and your readers will not be swayed by Mr. Winchester's scathing tone; scandalous remarks and malicious misinterpretations but instead see things in their correct perspective.

I have been holding the British press in a very high esteem and am confident, in keeping with the highest traditions of British journalism, a leading national newspaper like the Guardian will kindly publish this letter for the benefit of its readers.

S.K. Seth

(In a letter to the Guardian, London)

We did read the copy of the Guardian letter of Simon Winchester published in Blitz. It was discussed at the Field Directors' meet in Similipal. All of us felt very sad in sensing that it was founded on inadequate, perhaps to some extent motivatedly distorted base.

I deal first with his doubt on the credibility of population estimates of tigers in the tiger reserves, Similipal's in particular.

As you know, I had trained the representatives from different states and organised the first ever countrywide tiger census through the use of my Tiger-tracer. That census in summer 1972 took count of only the pugmarks traced during a period of one week of regimented application. All other evidences even if seen, had been ignored.

Lahan, who had headed the team that did the census in Assam wrote to me that although he had compiled the total figure of the pugmarks of 140 different tigers traced in his state, he was confident that the actual number of tigers was more than 300. In my paper, Tiger Census in India, published in your Society's journal, CHEETAL Vol. 15, No. 1, I have stated about the convincing evidences, other than pugmarks, of at least six tigers that I had found in South Similipal alone during the 1972 census. Those tigers had not been included in that count because their pugmarks had not been seen. The estimate of 1827 tiger stated to be existing then in the country — 142 in Orissa and 17 in Similipal — was, therefore, the minimum number confidently identified by their pugmarks only. What fractional proportion that count formed of the actual total existing during those seven days search would be anybody's guess. For, with all the sophistication in the methods of census it is not possible to count each and every tiger in any range, like in Similipal and

similar other tiger areas to truthfully state their exact number. If the truth about the actual number which was not practicable to count had been suppressed, it was done in the interest of the tiger. It was because the public, many even among the biologists, would not be able to comprehend the reason: that the elusive tiger is inherently elusive in nature to any method of total count. They would not understand the immense significance of population trend measurements repeated annually at the same season and time through its only confident parameter, the individually distinctive pugmarks, easily distinguishable as of male or female. On the other hand, people would readily accept numerical figures. And so it was, the number 1827 which could convince the public about the need for special conservation measures to save the future of this magnificent cat. The tiger was, indeed, in dire need of such focus of national attention.

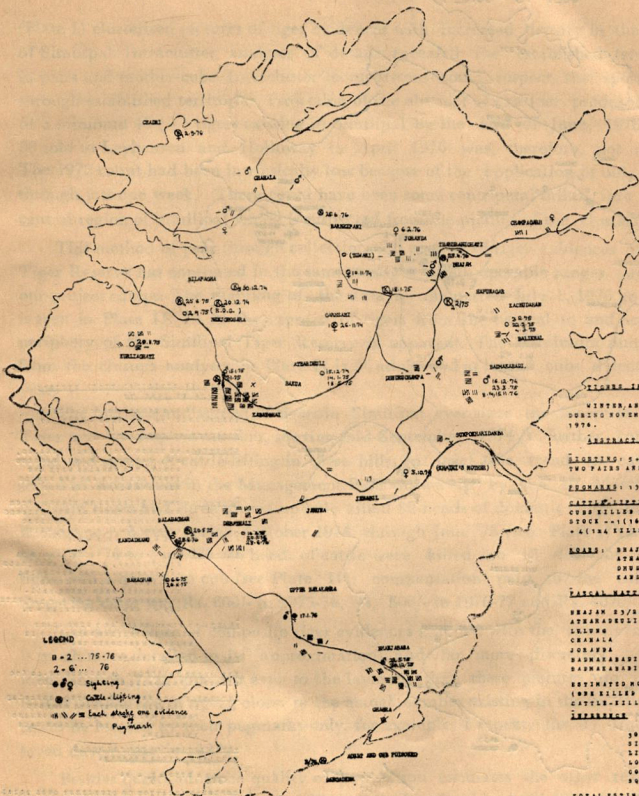
After the 1972 census no other population measurements have been done in the country except in our tiger reserves. The Tiger-tracer method of pugmarks count has been repeated in all except Similipal. In Similipal it has been changed to composite reckoning throughout the year which I will explain later in this.

The Guardian letter casts cynical doubt on the increase in Similipal Tiger from 17 in 1972 to 30 by 1976. To explain it, the first obvious question to be answered is: How was the figure 30 itself estimated? It happened thus: During their week's stay with me in Similipal and with Khairi in April '76, both Prof. Paul Leyhausen and Dr. Colin Holloway had been repeatedly asking me to make a hard guess. In the end I did invite their next question: How so much increase, from 17 to 30 in just four years? Paul himself suggested the answer with three probable reasons: (i) the low estimate of 17 in 1972 census; (ii) possible influx from outlying habitats into the protected reserve; (iii) overestimate in my own guess.

I had felt reticent in stating any number because I had by then organised the pooling of all evidences of tiger recorded in time and space over the entire Similipal Tiger Reserve (2750 sq km) continuously the year through by the project field staff positioned in strategic spread in these hills, except in the western enclave of chain-villages. This had started in October 1974. The tiger evidences were being documented in five categories: pugmarks traced; kills investigated; roars heard; excreta collected and tigers seen. The year ending was June 30 which I had skipped in 1975. The data in the pool had not been mapped and analysed. The estimate was not ready and hence my hesitation in guessing any figure.

In July 1976, all the data collected during nearly two years, October 1974 through June 1976 were placed on the map on the basis of their spatial locations in respective directions and distances recorded from the related project camps. This work produced on the map

OCTOBER '74 - JUNE '76



WINTER, AND SUMMER EVIDENCES AND EVIDENCES
DURING NOVEMBER, 1974 - THROUGH - JUNE
1975.

ABSTRACT OF INFORMATION

BREEDING: 5-11-62-4 = 33 TIMES INCLUDING TWO PAIRS AND ONE ADULT WITH CUB

REMARKS: 130-153-67-24 - 374' TIMES

CATTLE LIFTING: 7 DIFFERENT TIGRES AND 3
CUBS KILLED 30 HEADS OF DOMESTICATED LIV-
STOCK -- 1 (16 KILLS) + 1 (7 KILLS) + 1 (3 KILLS)
+ 4 (12 KILLS) MOTHER AND CUB POISONED.

LEADS: BHAIJAN 23/24. 12.75.
ATNARABULI 4.6.76.
DHUDHUCHANPA 29.7.76
KANDADRAPE 15.7.76.

PASCAL MATTHEI

WHAJAM 23/24. 11.75
ATEARADEULLI 11.75(3)
LELUNG 12.75(3)
CHABALA 9.6.76 (WILD BOAR)
JOLANDA 11.75 (PORCUPINE)
BAMHAKABAB 12.75 (LANGUR)
BAMHAKABAB 29.12.75

ESTIMATED MOLECULES - 32 ASSUMED NUMBER 30 -
(ONE KILLED WITH CUB BY POISONING ON
CATTLE-HILL)

REFERENCE

30+ FROM REPLICATED MOLECULES OF
SIGHTING, PUCKERS AND CATELY-
LIFTINGS. SAMPLED FROM 14 FIRM
LOCATIONS OF FOCAL POINTS WITH
COMMAND AREA OF AVERAGE 50-70
SQIN EACH - YWB SQIN

TOTAL ESTIMATE FOR THE WHOLE OF SIMILIPAL
TIGER RESERVE 30 x 2740 = 46..

SIMILIPAL

● 04-27



1 JUL 74 TO 23 JUL 74

ABSTRACT OF INFORMATION:

TONS CUB EACH &
WITH TWO ADOLFS

IDENTIFIED BY:

CATTLE-LIFTING: 18 CASES W

卷之八

PASCAL MATHIE: 6 72425.

RECEIVED BY POST OFFICE ON 6/11/54

FROM 24 FOCAL POINTS

1948

1888

DEFINITE LOCATION OF OIR-51

0000 Sighting: Sex unknown, Male, Female, Cub
 0x Cattle Lifting x = No. of Kill
 0000 Each stroke: One evidence of Pig mark
 ① One unit of Defecation
 R One Roaring evidence

0000 Sighting: Sex unknown, Male, Female, Cub
 0x Cattle Lifting x = No. of Kill
 0000 Each stroke: One evidence of Pig mark
 ① One unit of Defecation
 R One Roaring evidence

(Plate I) clusterised pictures of tiger evidences with increased density in the central region of Similipal. Intracluster analyses of details revealed the established territorials singly, in pairs and mother-cubs. Intercluster comparisons could suspect the sporadic transients through established territories. Projection of the abstract of analyses produced an estimate of a minimum 46 (+) tigers existing in Similipal by the end of June, 1976. My guess of 30 told to Leyhausen and Holloway in April 1976 was, therefore, not an overestimate. The 1972 count had been intrinsically low because of the application of only one parameter through just one week. There could have been some centripetal influx into the protected central region of Similipal which is suspected from the picture of the clusters in plate I.

This method of year through collection and pooling of tiger evidences in the Similipal Tiger Reserve has continued in the same measure within operable ranges around each of our project camps. The mapping of the data for the period July 1, 1976 to June 30, 1977 is seen in Plate II. In it, the spread of tigers from the central to and across the outer periphery of the Similipal Tiger Reserve is apparent. The minimum number estimated from the clusters analyses in Plate II is 56 adults and at least 5 cubs detected during the year.

The increase and spread of tigers in Similipal ever since the inception of the Project Tiger and its implementation, starting mid-September 1974 is further confirmed by the trend and spread of cattle-lifting in these hills. In brief the trend is: cattle-lifting was stated as occasional in the Management Plan drawn up by me in March 1974; seven different tigers and three grown up cubs killed 32 heads of domestic cattle on 13 occasions during the two year period, October 1974 through June '76 (see Plate I); in the following year July '76 to June '77, 36 heads of cattle were killed on 18 different occasions by 8 tigers and a grown up cub (see Plate II); compensation paid to the cattle owners in deserving cases was Rs. 600/- in 1975-76, Rs. 500/- in 1976-77 and Rs. 4070/- in 1977-78.

The above data of composite tiger evidences mapped with the annual sampling pictures is much more detailed in its approximation and far more discretely confident in its identification. It is apparent even to the layman that these pictures do reveal a much higher percentage of tigers, closer to the actual number existing in the Similipal hills than could be located by their pugmarks only, for example, I repeat, the 17 traced during the seven days census in 1972.

Besides questioning the quality of population estimates the other reason for casting serious doubt on my 'guestimate' of 30 tigers in Similipal in April 1976 has been stated in the Guardian letter to be the improbability of any tiger population increasing more than two percent annually. If it be so, then this doubt should be more serious on my objective finding three months later, in July 1976, that the actual estimate of tigers in Similipal was a minimum of 46 (+).

There could be no two opinions that the estimate of 17 in 1972 was far too low. But at the same time I do question the objective validity in the presumption that there would be no more than two percent annual increase in any tiger population. Biological inference is never authenticated by any presumption of howsoever authoritative the person may be. It can not be confirmed by quoting unnamed biologists either, as has been done in the Guardian letter.

The facts remain that the tiger has an ontogenically compelling season for peak breeding; that the female can get circumstantially induced even in natural state to breed out of season; that the gestation period is only $3\frac{1}{2}$ months; that the female is capable of dropping a litter of four cubs to successfully wean them with her four teats and that it is usual in a normal range to find 2 to 3 established cubs at heel with a mother. In a dynamic range of yester years, like it used to be in Kalahandi and Koraput districts of Orissa during the fifties, I have often seen a tigress moving with four established cubs. This will be borne out by Mr. P.K. Deo (former Maharaja of Kalahandi) the Vice President of your Society. And in those days it was not rare to find a mother with two age-grouped cubs, $1\frac{1}{2}$ year adolescents and a few month old young ones. With such a high biotic potential as this in tiger, it baffles me to reason out why and how such categorically definite statement could be published, unless motivated to create a wrong impression in the public mind, that because the tiger could not increase in number more than two percent annually, the figures given by the Field Directors were all a hoax. To this sort of unfounded and unfortunate slander I can only state that although most of the Field Directors had been drawn from the raw stock on wildlife, they are earnest and intelligent foresters experienced in the tropical woods. After getting in they got very soon involved emotionally with the purposeful spirit of Project Tiger. And because of it they have learnt fast to properly size the ecological interpretations, to evaluate the problems with pragmatic measures and to seize this opportunity to apply remedies that are often obvious to the common sense of any devoted field-man. They are stating facts which they believe to be true within the applicable method of measurements and available means of interpretation.

The Field Directors are certainly not having pretentious shows with cameras and calculators as the uneducated Guardian letter misrepresents. Photointerpretative methods of both random and systematic samplings at floating or fixed points in time and space are reliable measurements. They do freeze on celluloid many irrefutable evidences both scientific and juridical. Para 45.4. of the Management Plan for Similipal Tiger Reserve reads, "Cameras are important equipments for the field. Both still and movie cameras are necessary for spatio-temporal records of structure, physiognomy, function and behaviour at successively sequential or repetitive points in time and space both for the habitat and its inhabitants. Selected stills and edited movies would be the best aid to extension works

to raise the environmental consciousness of the people....." Simultaneous use of a large number of cameras in trip photography of self-portraiture by the animals themselves had also been proposed by me in the said Management Plan. Can you imagine the inestimable value of double beam interruption method of autophotography by large animals in infra-red with motorised miniature camera of fixed lens and electronic iris? If only I were equipped to randomly place about one hundred units of this selective sampling technique in stratified groups across roads, foot paths and game trails; over watering places, salt licks and loafing grounds and at such other utility points in the tiger reserve, I wonder how much more negatively critical the Guardian letter would be!

The genesis of the Guardian letter is suspected to have been biased with a 'search image' to denigrate the Indian effort in Project Tiger. For could anyone with the elementary sense of methodical approach think of any analytical data without a statistical calculator. Such a calculator proved its worth in my work and hence one each has been obtained for the other tiger reserves too. With the future establishment of ecological monitoring programmes the tiger reserves will be soon stepping into the realm of desk computers with programme cassetts available now in the Indian market. I am afraid, Simon Winchester's letter will considerably retard any such process of scientific maturity in the project.

The Guardian letter has complained about the delay in the publication of the report of the mid-term appraisers deputed jointly by the WWF & IUCN. Similar reports of international organisations are never published immediately after those are submitted by the authors. The original copies of such reports under limited circulation are always printed boldly with the legend 'NOT FOR PUBLICATION'. The mid-term report on Project Tiger is still under positively critical discussions and appropriate follow up actions. For all that is opined in that report is not the gospel truth to be accepted without question and without adequate relevances to conditions obtaining in this country. One of the important follow up actions is on ecological monitoring programme to adapt and finalise which we had the meeting and field exercise of the Field Directors held last in Similipal and Palamau Tiger Reserves.

Annual Reports are principally administrative resume of the planned implementations. News letters are published for popular consumption. I agree, the latter should have been issued regularly. But perhaps the project headquarters is not properly geared to compile and publish it in time. However, that should not give cause to suspect any hesitation to publish.

WWF funds have not been mispent. Out of the promised contribution of one million dollars which is less than a sixth of the total outlay by government of India, only about

4,00,000 dollars have been spent on equipments directly purchased by W.W.F., cameras and calculators including.

The lengthy prologue to the accusations by the Guardian letter merits few comments. I would, nevertheless, mention that condemnation of healthy sports is irrelevant to a time when tigers had been plentifully productive to provide enough resource for such sport, irrespective of how the trophy was being appropriated by the privileged. And again, would the recounting of the fictitious number of 40,000 tigers which could never have been ecologically possible in this country, add any convincing support to the claim of the tigers? Should we not expect better weight of facts in the Guardian?

I was inclined to ignore it all, as I have the similar other in the past. Your demi-official letter has persuaded me to write this. I would be happy if you publish it alongwith the Guardian letter as suggested by you.

S.R. Chaudhury

(in a letter to the Honorary Secretary,
Wildlife Preservation Society of India)

Coming to you after a long interval, this letter of mine is addressed to you for I do not know whom to write giving vent to my feelings and seeking redress of damage which may well have been caused by persons of dubious intentions. Lately I have really been somewhat confused by what has been appearing in the press with regard to Project Tiger. Why so much mud slinging in the sacred name of WWF? Apparently the main target was the ex-Director Mr. Sankhala, but without prejudice to the unique service rendered by Mr. Sankhala in his own way, I must say that if one did not like him as the Director of the Project in Delhi, one also knew that the main effort was not concentrated there, but was sustained in the field. Why, then, should the real success of the Project be undermined bringing blemish to the country, apparently for personal likes and dislikes? I am refering to a few articles that comment on the progress of the Project and have appeared in The Guardian (UK), The Blitz, The Northern India Patrika and The Hindustan Standard.

Field Officers have been toiling hard and doing their best in the Reserves, with a measure of success, one could confidently claim to be unparalleled anywhere in the developing world and perhaps even in the developed world if one were to view it in the light of the abundant resources the latter possess. I say so not only in the context of Kanha but in general of all the Tiger Reserves. Substantial ground has been covered in the

field of enforcement of protection and recovery of habitat which have, in no uncertain manner reflected in the improvement in the status of all species including the tiger. Why then such sweeping statements not only seeking to belittle the effort in all the Reserves but casting aspersions on the very honesty and sincerity of the Project Officials? What comment or observation in the report of the IUCN-WWF Appraisal Team (M/S Holloway, Leyhausen and Ranjitsingh) was so castigating about the manner in which the Project was being implemented or about the progress that it had made? By and large the report was appreciative and where criticism or apprehension was voiced, such was in some instances not altogether well founded, due probably to inadequate or incorrect informations or contentions. I am sure all of us in the Project had taken the comments and the criticism in the same healthy manner in which, I am sure again, they were offered by the IUCN-WWF Team.

Friendly cautions such as against the tiger population in some Reserves increasing due partly to immigration from nearby areas (in response to better environment now available in the Reserves) were taken well. But even this was to the credit of the project in that at least such immigrating tigers now had a better and more assured future. Apprehensions like the 1972 tiger census being an under-estimate were based on surmises and hearsays. I do not think that a general All India census of Tigers could have a much higher degree of accuracy than what the 1972 census had. The method based on tracks demands intensive field survey, precision in tracing outlines of different pugmarks and careful analysis, but if done well can be as accurate as counting by direct sighting (presuming hypothetically that sighting all tigers is possible). Such exacting standards are, however, difficult to realise in a mass-scale operation but then in the general forest areas one is confronted with a very thin density of distribution, and a mere reporting of a fresh pugmark can be an indication of the presence of a tiger. On the other hand in sanctuaries and national parks from which nearly all the Tiger Reserves came to be constituted—the 1972 census was carried out with a much better measure of reliability. There is, therefore, little to doubt that the 1972 figures expressed the real population to a fair degree of approximation. I do not know how Leyhausen arrives at a figure of just 2% annual rise for the tigers, even after setting off infant mortality due to intraspecific stresses and other extraneous natural causes. Of course in an area given to poaching and habitat ravage involving both the predator and the prey, even a growth rate of 2% will be non-existent. In such situations, as a matter of fact, a negative growth rate will prevail. Quite apart from the fact that the measure of general antipoaching control over all the forest areas is much better than what it used to be in the sixties, there can be absolutely no doubt that the measure of such control is far superior in the Tiger Reserves.

Far reaching improvement programmes have been implemented and even for a layman it is not difficult to see the tremendous improvements in the environmental conditions. If a layman's measure of status improvement by way of increased sightings is taken into account, the increase can be indisputably inferred. From my own experience in Kanha, which I hope not to be a layman's, I can say that the population growth for tigers has been at least 10% per annum. As a matter of fact in Kanha the growth rate has been higher if one were also to reckon the tigers that have emigrated from the park to the adjoining areas. It has been interesting to observe in Kanha that tigers have moved out from the park to adjoining areas because of intraspecific stresses. This is quite different from many Reserves where the traffic has been opposite, tigers from outside coming and settling in the improved environs of the newly created Reserves. This is but natural to expect and a comparison of the two phenomena reflects the relative degrees of development occurring in a conservation area of long standing such as Kanha and that in a newly created one.

Be as it may, in the central part of the old area of Kanha alone I have seen 24 cubs brought up to adulthood since 1966. These I have actually seen and this figure is not based on track counts. Besides in the other areas of the Park there has been substantial evidence of other litters having been reared, both by way of sightings and track-counts. I therefore believe that proportionate to the development of the environs and the prey base, the growth rate for tigers per annum can be anything from none to well over 10 percent. Surely in the tiger Reserves, all of which started with a relatively fair prey base and which stand out in receiving an intensive protection and developmental treatment, the growth rate has been much higher than the 2% suggested by Dr. Leyhausen.

I also do not agree with the IUCN-WWF Report that the sub-adult tigers encountered during the track census should not be reckoned towards increase in the population for reasons of their susceptibility to mortality due to intra-specific stresses or other causes. This is because in the first instance until the cubs are at least three months old, they do not start trailing the mother and will escape being counted due to absence of track evidence. Further the cubs that have reached this stage are likely to have an assured survival because of reduced susceptibility to disease or inter-specific reactions. The hazard from intra-specific stresses will however persist, but then even the adult tigers are not immune to this. Secondly while reckoning such susceptibility to sub-adult mortality, it is to be appreciated that the voids thus created keep ceaselessly filling up from breeding by way of arrival of fresh litters.

However critically one looks at the Project Tiger, resolute progress has been registered in all the Tiger Reserves—a progress that justifies the outlay from various sources viz. Rs. 80 00 lakhs (one million dollars) of WWF, Rs. 400.00 lakhs of the Government of India and a much

higher contribution of the State Governments who besides spending even larger sums have sustained far higher losses in forest revenues by foregoing forestry operations. What is even more important than the assessment of a numerical increase in tiger population, is the establishment of conservation areas of sizeable extent that have come to a take-off stage from where the increases henceforth will be much faster than hereto. The resolute stance of the Governments of India and the state Governments further affords an assured future to the Tiger Reserves.

If therefore, one were to delve into the real perspective, one is pained to observe the irresponsible mudslinging in the press. Unfortunately the ringing tone in the articles is as if the views are of the WWF. It is for this reason that I have come out with this detailed account in the sincere hope that the WWF will officially counter the irresponsible propaganda emanating from personal likes and dislikes. It is really criminally mean on part of the writer to have said that the money so sincerely raised by the school children in Europe has been misused. The contents of the report of IUCN-WWF Team should not have been given a twisted interpretation by playing up the advice of caution to be a debasing criticism. Photography is a common and accepted tool of scientific investigations necessary both for sound scientific management and research. This is the only 'SOPHISTICATED EQUIPMENT' received under the project, unless the capture equipment for wild animals, the vehicles and the wireless sets are also so regarded.

This is not to mean that the entire functioning of the project has been flawless for no human effort can so be, but the fact remains that results achieved hereto are entirely satisfactory. I would indeed be obliged if I have your views on this issue. I am also sending copies of this letter to Mr. Duleep Mathai, Mrs. Anne Wright and Mr. Futehally with a similar request. I strongly feel and I am sure you all share my feeling that the Governmental agencies and WWF have to make a common cause and even if misunderstandings crop up like what surfaces from the reading of the press articles aforesaid, these can be thrashed out by a frank dialogue.

H.S. Panwar,
Field Director Project Tiger
Kanha Tiger Reserve, Mandla.

(In a Letter to Mrs. D.S. Variava,
Administrator, Wildlife Fund, India)

I was immensely happy to read your letter (D.O.) No. ST/83 dated 3.6.1978 addressed to Mrs. D.S. Variava, Administrator, World Wild Life Fund - India and I should congratulate you on writing such a bold article depicting a factual picture about the Project Tiger

conservation movement which is so creditably steered by the sincere bands of field workers in different Tiger Reserves of India. As I took over charge of Field Director on 19th June, 1978 I could not write to you earlier than this on this matter.

I fully agree with your views expressed not only on the growth rate of tiger population but also on other important aspects of conservation efforts you had mentioned in your letter. It is high time that such mud-slinging should immediately stop concerning Project Tiger. It is really a sorry state of affairs that personal likes and dislikes, perhaps petty mindedness had played a great role in narrowing down the big achievement of this unique conservation movement which really deserves commendation from all conservationists and ardent lovers of nature. (I am sure you have read some articles giving vent to their sharp criticisms on such twisted efforts of so called experts published in Amritabazar and Hindustan Standard dailies where some home-truths were depicted.) In case you could not get hold of such, I would send you copies of those for your perusal.

Thank you once again for vindicating your thoughts candidly on project tiger movement in India.

Yours sincerely,

(K. Chakrabarti)

(In a letter to Sri. N.S. Panwar, I.F.S.

Field Director, Project Tiger

Kanha Tiger Reserve, Mandla)

We would like to thank you for having written to us and sought our comments on the ill-informed controversy that has been raging in the press over Project Tiger. Regarding your query, let me assure you at the outset that Mr. Simon Winchester's article in the Guardian certainly does not carry the blessings of World Wildlife Fund—India. Nor does it, in any way, accurately reflect the contents of the mid-term report. It is indeed unfortunate that so many Indian papers should have relied on this article, or on subjective conjectures, rather than on the original report itself for their facts. For the benefit of your readers we give below the correct position.

1. A mid-term appraisal was envisaged in the original Project plans and IUCN/WWF were commissioned by the Government of India in 1976 to have such a mid-term report prepared. The study team considered of 3 members of equal standing:

(a) Mr. M.K. Ranjitsinh, former Director (Wildlife and Forests) Government of India and presently Regional Adviser for Asia and the Pacific, United Nations Environment.

- (b) Mr. Collin Holloway, Ecologist Research and Planning Group, International Union for the Conservation of Nature & Natural Resources.
- (c) Prof. Paul Leyhausen, Director of Research, Max Planck Institute for Animal Behaviour and Chairman of the Cat Group of IUCN's Survival Service Commission.

(The allegation is certain papers that the report is a chauvinistic attack by "foreigners" is incorrect since Mr. Ranjitsinh, as one of the 3 members, is an Indian who enjoys the highest respect of those connected with Wildlife Conservation, and has not placed any note of dissent on the findings of the team).

- 2. The reports opening paragraphs give the context of the report and are of paramount importance. I reproduce relevant portions below.

"This report assesses the progress of Project Tiger during its initial three years. It attempts to identify weaknesses and shortfalls in achievements and to make recommendations to strengthen or to improve existing conservation efforts.

By its very nature, much of the report is concerned with criticism of the Project's implementation. The authors wish to confirm at the very outset, however, that Project Tiger has already achieved a number of quite outstanding successes in furthering the Indian tiger's chances of survival and that reflect great credit on all who have been associated with it."

As regards the overall concept of the project, the report states:

"We consider the overall concept and original strategy of project Tiger, namely the establishment of a series of carefully protected breeding nuclei from which animals would replenish surrounding areas, to be sound in principle."

- 3. While the report provides many constructive suggestions, at no point is there any allegation whatsoever of misuse of funds and it is in this respect that Mr. Winchester's article is particularly to be deplored as a distortion of facts.
- 4. All items of equipment purchased for the Project from WWF Funds have been cleared by both the Government of India Steering Committee for Project Tiger and by WWF/IUCN and the report merely stresses the desirability of obtaining more expeditiously such basic equipment as binoculars and fire-fighting equipment—without denigrating the need for such aids to research as cameras and calculators.
- 5. Such other advice or suggestions as have been offered have been with the objective of assisting those concerned with the implementation of the project and without, in any way, minimizing any of the excellent work that has already been done.

Finally, the allegation that the report was suppressed by the Government of India is totally baseless. Being commissioned by the Government of India it could only be released after consideration by the special Steering Committee responsible for Project Tiger. This report was discussed at one meeting (in December 1976) but before its clearance at the next meeting, the political situation changed. A certain amount of time inevitably elapsed between the resignation of the previous Chairman of the Steering Committee, namely Dr. Karan Singh, and the appointment of the new Chairman, Mr. H.M. Patel. The report was considered and cleared for publication one month before Mr. Winchester's article appeared in the Guardian. It is available to anyone interested in the report—and we would recommend that, in the interest of settling the present controversy, you may wish to publicise the initial section of the report which is entitled 'Summary and Major Conclusions'. Alternatively anybody interested in this, is free to obtain it from us.

Yours sincerely,
Dilnavaz Variava

Hon. Adviser

WORLD WILDLIFE FUND—INDIA

(In a letter to the Hon. Secretary
Wildlife Preservation Society of India

The Truth about Project Tiger

REJOINDER TO A FOREIGN CRITIC

By

S.P. SAHI

SIMON WINCHESTER's article on India's tiger conservation efforts, published in the Guardian of London, has been reproduced in full on the central page of a Bombay weekly in its issue of April 29. The weekly's own advice to save the 'tiger' is; "To shoot down the Paper Tigris" first. Simon writes ".....all told Mr. Sankhala was able to offer an extrapolated figure suggesting that the 1827 tigers known to exist in 1972 had increased by 40% ensuring that even if the project ended there and then tigers had been saved from the perils....."

Project-money is being exclusively spent on nine Tiger Reserves. For the comfort of Simon, the increase claimed in these reserves is 82 per cent and not 40. And, this was the claim made in 1976 when Project Tiger was only three years old. This astounding claim was

made in the letter of the Department of Agriculture dated September 25, 1976. This reads "An estimate of the trend of growth in tiger population is given below:

Tiger Reserve	From	To
Manas (Assam)	31	41
Palamau (Bihar)	22	30
Similipal (Orissa)	17	50
Corbett (Uttar Pradesh)	44	55
Ranthambore (Rajasthan)	14	20
Kanha (Madhya Pradesh)	43	48
Melghat (Maharashtra)	27	32
Bandipur (Karnataka)	10	19
Sunderbans (West Bengal)	50	175
	258	470

My own objection to these figures springs from the fact that the project report drawn by Government experts in August, 1972, mentions that no figures for tiger population were available for Sunderbans and Similipal. How did the base figures of 17 for Similipal and 50 for Sunderbans become available in 1976? An increase from 258 to 470 in tiger's population in three years! Who is going to believe this 82% population rise in a three-year period? Nothing has harmed tiger's cause and shrouded the hard work of field workers more than what Simon justifiably brands "extravagant claims".

But, should this distract us from the pith of the tiger conservation issue? If the habitat is protected, core is kept free from biotic disturbances, prey-animals allowed to increase, poaching eliminated and, above all, adequate water provided, then the tiger will look after itself, a wholesome population equation will be established between the tiger and the herbivores. Such is the law of nature in a well-looked after ecological system. This will happen, no matter how long and in what manner we continue to quarrel over tiger's population dynamics. Success of Project Tiger cannot be measured by a tiger census, which can never be perfect.

I have been a regular visitor to one of the Reserves—Palamau Tiger Reserve. I was the Divisional Forest Officer of this area in the 50's, later its Conservator of Forests, and ultimately Chief Conservator too. Closure of project's core area to all human activity, stoppage of tree felling, ban on cattle grazing and effective fire protection measures have wrought wonders in tiger's habitat. In most Indian forests, streams dry up rapidly by February leaving a few natural water holes. A tiger has to drink water daily and even bathe when it is very hot. It has always been heartening to see these water-points maintained every summer.

A leopard was once sighted drinking water from a trough especially fabricated to provide additional water, a tiger bathed in another, leaving its pug marks around as evidence. I was in Corbett Park in April this year—another project centre (Uttar Pradesh). Spectacular sights of Chital-deer numbering 150 to as many as 300 in each herd in broad daylight prove how well the tiger core is being looked after. Simon has not seen such sights; yet he writes “there is, as yet, little to show by way of conspicuous success”. He wants to see the elusive tiger at every nook and corner, this seems to be his yard-stick of success.

Simon Winchester speaks of the money raised by school children in “Britain, Belgium, Holland and Germany”. Guy Mountfort an international trustee of the World Wildlife Fund (WWF), impressed his audience in New Delhi in April 1972 (I was one of the listeners) by his assertion that “Tiger” was not only India’s but “World Heritage”. The man-made rock temples of Abu Simbel were saved from being submerged in Aswan Dam by international effort and finance so he said. It was therefore laudable for European children to raise funds for saving tiger in another continent but equally praiseworthy, if not more, has been the silent and untrumpeted sacrifice of those who have shifted their century old villages lock-stock-and-barrel and of the thousands of tribals who forsook their source of livelihood: closure of forestry operation in the project’s core was such an immediate imperative. In Palamau alone Rs. 15 lakh went as wages each pre-project year from the forests, now frozen to forestry operations.

Simon quotes Leyhausen as having said: “It was doubtful that any tiger population in the wild would increase at a rate greater than 2 per cent a year.” Leyhausen is known for blurring instant figures. In 1969, he said “a genetically viable Tiger Reserve should have a minimum area of 3,000 sq. kilometres with a population of 300 tigers in it.” To my question how these figures were arrived at, he was frank enough to admit “these were off-the-cuff figures”. This meeting between him and me took place when he was in India as a member of the WWF Cat specialist team for a probe into how the project was running. He further confirmed this in a letter to me from West Germany. He wrote in August, 1976, “..... you are quite right—and I always stress the fact—that the figures given by me at the 1969 General Assembly in New Delhi were off-the-cuff figures. The question was suddenly sprung on me and I had no other way of doing it.....” He further wrote in the same letter “that on the basis of mathematical models by one Dr. Frankel the result came up with exactly the figure I gave off-the-cuff: 300”. Not knowing what knowledge Dr. Frankel has of tiger’s wild habitat and what parameters he fixed for his design, I cannot comment on Leyhausen’s snapshot figure of 300. More interesting, however, is his reply concerning the other figure of 3,000 square kilometres as minimum area for a viable tiger habitat. He mentioned in his letter “.....the figure originally given by me at Delhi was 3,000 square miles. Later for more or less political reasons, I narrowed this

down to 3,000 square kilometres.....“ In this background one will be justified to ask, what is Leyhausen' sbasis for fixing 2 per cent as the norm for maximum annual increase in wild tigerpopulation? Is this an off-the-cuff figure too? Or based on mathematical models by people not familiar with tiger's wild ways? Or for 'political reasons'?

Besides Leyhausen, who were the other two Cat specialists? Collin Holloway, an ecologist who has worked in African conditions, and Ranjeet Singh, an officer of the Indian Administrative Service. Neither Collin nor Ranjeet claim to be Cat specialists. And, Leyhausen in Max-Planck-Institute for 'Verhaltensphysiologie', West Germany, works on captive. These are the backgrounds of Simon Winchester's Cat specialists.

Simon is very uncharitable to write “a formal assessment of the project two years ago by a three-man team of cat specialists..... was suppressed by the Indian Government.” It is the unfortunate style of functioning of our Government, and not deliberate suppression, that gives rise to this accusation. All their documents know only one travel route—the slow, winding path ribboned with officials uninterested in most of them. But what about the WWF itself? It has a quarterly newsletter published regularly from Bombay. Leyhausen's report could have been serialised in it—this is not a banned document. The WWF (India) have a copy: I know.

Purchase of cameras, carousel-projectors, calculators, and even type-writers has been described as “wasteful expenditure”. These were not purchased by the Delhi Directorate but donated by the WWF. It is they who drew the list of equipments needed for 'Project Tiger'. The WWF newsletter (Bombay), July-September, 1974, issue (No. 13) carries a photograph of Dr. Karan Singh with the caption “Dr. Karan Singh, Chairman, Project Tiger steering committee, examines jeep wagoneers, guns, and type-writers donated by the WWF.”

The same issue records—“By now 4 imported jeep wagoneers (why were they imported? No Indian authority asked for imported jeeps), and six Indian jeeps have been handed over to Dr Karan Singh and Mr Sankhala respectively. Each Tiger Reserve and the Project Tiger Headquarters at Delhi have now a vehicle to provide the mobility that is essential for managing and patrolling the Reserves..... the Ordinance factories are processing WWF orders for rifles and binoculars. Wireless frequencies are being determined for Project Tiger and the supply of office equipments such as type-writers and field equipments will soon start.” What other equipments do the Field-Directors have that Simon Winchester is shouting about? And, are these sophisticated equipment not relevant to tiger conservation?

I was in Similipal Tiger Reserve—the third centre I have recently visited—in November, 1977. Members of the Public Accounts Committee of the Orissa legislature were there at the same time. The Field-Director used the carousel-projector (donated by the WWF) to explain with photo-slides taken with the WWF camera, essential feature of the project and tiger's fascinating ways with telling effect. Wild-life photographs provide evidentiary values. I had once photographed a tiger in January and again in the following June. The argument whether the two photographs were of the same animal could only be settled by examining the markings on tiger's forehead printed on the photographs. Like human finger prints they differ with each animal. Wildlife-photography becomes a passion that motivates wildlife managers to become good naturalists. M. Krishnan, India's noted wildlife expert and naturalist, would not have been what he is, but for his love for wildlife-photography. Officials of WWF who purchased cameras knew their indispensability. The WWF man who told Winchester "I cannot in all honesty see how the tiger can derive any benefit from the purchase of a Nikkormat camera.....must either be a naive or a novice ignorant of the minds of his own colleagues involved with the 'Project' right from its inception.

To buttress his point, Simon quotes from an interview with Srivastava, the new Inspector-General of Forests (IGF). The IGF is reported to have remarked, "All you really need is tough legislation against poaching, good communication to guard forest reserves.....they do not need cameras and calculators, just guards to chase away poachers and policies on tree-felling." Wildlife (Protection Act, 1972 is a tough legislative measure, as tough as any in the world. No new legislation is called for. What else is the field staff doing except driving poachers, conserving forests (including fire protection, and intensive soil conservation measures), ensuring that trees are not felled in the project's core? Is there anything new in Srivastava's suggestions which is not being implemented in the project already, except his dislike for cameras, claculators, and carousel-projectors?

Most shopkeepers in my town (Ranchi) have pocket calculators. The WWF's money utilised in India so far is a mere 35 lakhs; five per cent of the project's budget, Even this pittance of 35 lakhs was accepted to enable the world community to have a sense of involvement in the campaign to protect 'World Heritage'. Cameras, calculators etc, have cost the WWF an insignificant amount, Frequent jaunts by foreign WWF officials and inexperienced University teachers from Oxford, Cambridge etc., teaching a subject even remotely connected with wildlife conservation to project centres in India, as WWF representatives (similar to Sankhala's visit abroad; Simon complains) have cost much more. Whose money has been spent on these pleasure trips? How has the tiger benefited by such jaunts?

But one man's folly should not be used to project an image that everything is wrong with the project. The Field-Directors (many of them senior to Sankhala in service) have been doing excellent work and so are the four hundred and odd other ground staff, in an unenviable environment—with forest lessees, poachers and above all local politicians; all hostile to the project. In his anxiety to condemn an individual, Simon Winchester has ended up by writing a drain inspector's report (without inspection). An article of this nature reproduced in our national dailies and a weekly, merely because it has been published in prestigious Guardian, damages tiger's cause by unwittingly playing into the hands of vested interests of forest contractors who have never been happy with the project that stopped timber contracts from large areas.

Courtesy: Hindustan Times

Project Tiger

I have just seen your editorial "Tiger Tales" (June 11) concerning the article in The Guardian by Simon Winchester on Project Tiger. The comments have clearly been made without reference to my subsequent letter to The Guardian in which I sought to clarify the misunderstanding which could arise from Mr. Winchester's article.

The World Wildlife Fund Report to which Mr. Winchester refers was prepared jointly for the Indian Government by Dr. Colin Holloway, ecologist of the International Union for Conservation of Nature and Natural Resources (IUCN), Professor Dr. Paul Leyhausen, of the Max Planck Institute and a leading cat specialist, and Mr. M.K. Ranjitsinh, a senior Indian official who is the representative of United Nations Environment Programme for Asia and the Pacific. Mr. Ranjitsinh is one of the leading experts on Indian Wildlife, and tiger, in particular.

The report opened by saying: "By its very nature, much of the report is concerned with criticism of the Project's implementation. The authors wish to confirm at the very outset, however, that Project Tiger has already achieved a number of quite outstanding successes in furthering the Indian tiger's chances of survival that reflect great credit on all who have been associated with it. The aim of this report is to maintain and improve the momentum already begun and to point the way to ensuring that the ultimate objectives of the programme are achieved."

The report was not suppressed by the government, nor is its circulation restricted. There was delay in its release largely due to the general elections and the change in chairmanship of the project. Since release was authorised late last year some 70 copies have been distributed some to journalists. No one has been refused copies.

As far as the use of funds pledged by the World Wildlife Fund is concerned—information which is freely available—these have been mainly for equipment such as vehicles, binoculars, radio networks, and specialists assistance. While protection is all-important, active management of conservation areas is usually necessary nowadays because of their limited size. Scientists from the British Institute of Terrestrial Ecology visited India, as part of World Wildlife Fund assistance, to assist in establishing monitoring systems of vegetation and mammal populations. This monitoring requires photographic records, and involves mathematical calculations—thus the supply of cameras and small electronic calculators.

A great deal has been made of whether there has been an increase or not in the tiger population. The report certainly urged great caution in assessing wildlife trends, largely on the grounds of lack of data on normal fluctuations in species populations. It remarked that the data from the 1972 tiger counts was subjected to particularly stringent analysis and several directors of tiger reserves considered the total estimate of 1,827 tigers to be an underestimate. But discussion of this issue should not be inflated to a major dispute.

The project has moved beyond simple protection of the tiger and its prey—which continues to be all important, as your editorial rightly emphasises—and now the emphasis is shifting to scientific management and monitoring programmes, for which a basis has already been laid with the help of scientists whose services have been provided by the World Wildlife Fund.

I should like to put the project into perspective by recording the view expressed by a senior Indian official, which is shared by the World Wildlife Fund, that Project Tiger represents the conservation of whole natural ecosystems, which have important, perhaps crucial influence on water regimes in surrounding agricultural areas, protection of soils, and local climates. It is to benefit the human population, not merely to save a spectacular animal.

No project fulfils everything that is hoped of it, but it can be said that Project Tiger has been a notable success, not only in India, but in a world context.

PETER F.R. JACKSON

(Director of Information World Wildlife Fund)

Morges, Switzerland

In a letter to the Editor, Times of India.

The Phantom Killer of Dogadda



(See Page 17)

Photos by: M.M. Pant

Brain of *Gavialis gangeticus*

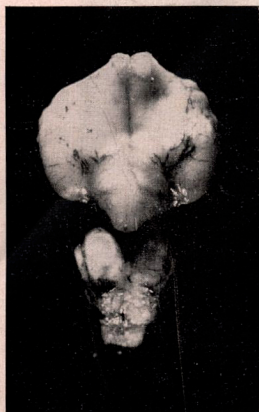


Fig. 1



Fig. 2



Fig. 3

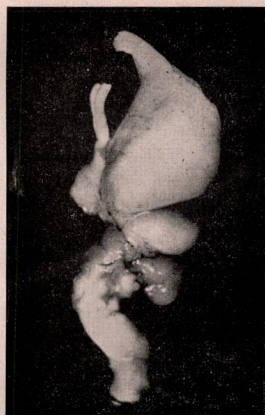


Fig. 4

1, 2, abnormal brain, dorsal and lateral views. 3, 4, normal brain of 20 weeks old gharial, dorsal and lateral views.

Significance of the absence of optic nerves in a teratological specimen of *Gavialis gangeticus* (Reptilia : Crocodilia)

By

A.N. SINGH AND B.K. TANDAN

(Department of Zoology, University of Lucknow, Lucknow-226007)

Two centres for the rehabilitation of *G. gangeticus* (Gmelin, 1789) and *Crocodilus palustris* Lesson, 1834 have been set up by the Forest Department of the U.P. State Government—in Katarniaghat, District Bahraich and in Kukrail, 13 km from Lucknow. Eggs laid in nests along the river bank by a remnant of a once flourishing population of *G. gangeticus*, in Chambal river at Chambal, were collected some time in the last week of May, 1976 and brought to Kukrail nursery. One clutch of 60 eggs on incubation in a sandy nest, simulated to resemble closely the natural nests, produced 55 hatchlings on June 6, 1976. The latter were immediately released into a pond 2×2 metres, with a slanting bottom, being at ground level at one end and 30 cm deep at the other.

One hatchling failed to catch the small fish provided for feeding. Examination showed it to be blind; consequently, the attendants force-fed it by hand for 17 weeks on fresh water fish (*Puntius chola*, *P. sophore*, *P. ticto*, *Mystus tengara*, *Ophiocephalous punctatus*). Although it grew satisfactorily, attaining a length of 58.5 cm, as against the average length of 61.5 cm of hatchlings of the same clutch, at 17 weeks it was distinctly weaker than its mate—its weight being 240 g against the average weight of 379 g. Being blind and disabled this specimen was ultimately handed over to us for studying the hypothalamo-hypophyseal system.

Examination of the hatchling before anaesthetisation showed its ocular region to lack the eye lids and to be completely covered over by an uninterrupted stretch of slightly bulging skin. On removing the skin from the skull an aperture about 3 mm in diameter and growth of cartilage, along the margins of the five orbital bones, were detected; the cartilaginous growth explained the narrow aperture of the orbit. Further dissection failed to reveal the eye ball with its normal components; instead the orbit was found to contain a mass of muscles and connective tissue which occluded the aperture.

When the brain of the hatchling was being removed, no optic stalks for severance were encountered; after removal it was seen to lack the optic stalks as also the optic chiasma (Figs. 1, 2). Apart from this abnormality the brain appeared normal; it is available for examination. The most obvious explanation for this abnormality seems to be the presence of a deleterious gene in the genome.

Absence of the optic stalks shows failure of the formation of the optic vesicle and that of the eye lens shows failure of lens placode formation. In the Amphibia, lens placode formation is either independent of or depends on the inductive influence emanating from the optic vesicle.¹ The simultaneous absence in this specimen of the lens and optic stalks favours lens placode formation in the ectoderm in *G. gangeticus* to be dependent on the inductive influence of the optic vesicle.

We are thankful to Mr. V.B. Singh, Chief Wildlife Warden, U.P., for providing the abnormal specimen of *G. gangeticus* and all information on its biodata and to Dr. S.C. Baugh, of this Department, for profitable discussions.

1. Nelsen, O.E., 1953. Comparative embryology of the vertebrates. McGraw-Hill, New York, N.Y.

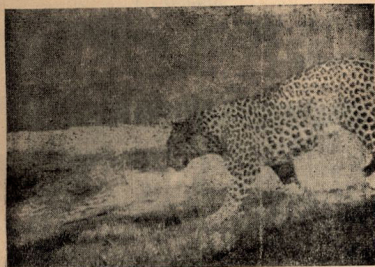
In the wealth of woods since world began
The trees have offered their gifts to man

—Henry Van Duke

* * * *

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